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ANNUAL REPORT

OF THE

TRANSIT DEPARTMENT



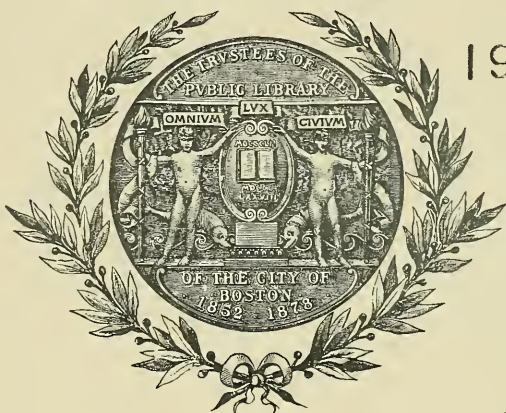
OF THE

CITY OF BOSTON

1930

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COMPLIMENTS OF

TRANSIT DEPARTMENT—CITY OF BOSTON

THOMAS F. SULLIVAN, *Chairman,*
NATHAN A. HELLER,
ARTHUR B. CORBETT,
Commissioners.



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REPORT
OF THE
TRANSIT DEPARTMENT
FOR THE
YEAR ENDING DECEMBER 31, 1930



CITY OF BOSTON
PRINTING DEPARTMENT
1931



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1930

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ANNUAL REPORT
OF THE
TRANSIT DEPARTMENT
FOR THE YEAR ENDING DECEMBER 31, 1930.

1 BEACON STREET, BOSTON, MASS., January 1, 1931.

To the Mayor and City Council of the City of Boston:

The Transit Department submits the following report for the year ending December 31, 1930.

GOVERNOR SQUARE EXTENSION OF THE BOYLSTON STREET
SUBWAY.

The Legislature of this year passed Chapter 394 providing for an extension of the Boylston Street Subway at Governor Square. This Act was in the nature of an amendment of Chapter 341 of the Acts of 1925.

For many years, traffic conditions at Governor Square had been the subject of vigorous discussion, but it was not until 1925 that the Legislature passed Chapter 341 of that year which provided for the elimination of the crossing at grade at this point and the extension therefrom of the present Boylston Street Subway, continuing out Commonwealth Avenue and Beacon Street. Following the passage of this legislation, many engineering studies and plans were prepared to effect the change. Nothing came of it, however, by reason of the fact that the directors of the Boston Elevated Railway Company did not accept the Act, as required. Their objection was based largely on the financial features of the Act insofar as they referred to the rental provisions.

Under this Act of 1925, it was provided that the company should pay a rental at the rate of four and one-half per cent per annum upon the net cost of the extension with a further stipulation that the annual rental should be sufficient to provide an amount equal to one-half of one per cent of said net cost in addition to the annual amount of interest on the bonds issued to pay for such net cost, but not less than said four and one-half per cent on the net cost in any event.

The Boston Elevated Railway Company took the position that unlike all existing Boston subways, the conditions at Governor Square were not created primarily by street railway transportation operation, but were to a large extent the result of automobile traffic, and for this reason, insisted that in the fixing of a rental rate, this situation should be kept in mind. Various suggestions were made to bring about an agreement, but without success, until the present year when Chapter 394 was passed. Under the provisions of Chapter 394, a definite amount, namely; \$3,100,000, was established as the net cost upon which the Boston Elevated Railway Company would be called upon to pay rental, and the rental was fixed at a figure which would be sufficient to provide an amount equal to one-half of one per cent of this net cost, in addition to the annual amount of interest on the bonds issued, but in no case should the rental be less than a four and one-half per cent rate. It was provided, however, that such rental should be payable by the Elevated Company in any year only if and to the extent that the reserve fund provided for in the Public Control Act of 1918 exceeded on the last day of each June, during the term of the lease, the amount originally established, and if the company did not make such full rental payment, the City of Boston would pay out of its tax levy one-half of the deficit, and the Commonwealth would assume and pay over to the City of Boston the other half obtained by assessment of such amount on the cities and towns comprising the Boston Elevated district as provided in the Public Control Act.

A further important change was made in the Act of this year, wherein it was permitted that the work could be carried out by the day labor forces of the department, thus following the method employed in the building of the Maverick Square Station of the East Boston Tunnel in 1921. At that time, the President of the United States asked public authorities to help relieve the unemployment situation and in particular afford an

opportunity to men who had lost continuity of their employment by serving in the World War, and in response to this request, employment was given to approximately 1,700 war veterans in the building of the Maverick Square Station, a project constructed efficiently and economically — a tribute to the resourcefulness and skill of our citizen labor.

Similarly, in this project at Governor Square, His Honor Mayor Curley petitioned that permission be made in the bill for construction by day labor forces, and this suggestion was adopted by the Legislature. In this connection, it is interesting to note that the work thus far is progressing most satisfactorily and well within the engineers' estimate of costs.

Chapter 394 of the Acts of this year, shown as Appendix A in this report, was approved by His Excellency, the Governor, on May 28, passed by the City Council on June 2, approved by His Honor Mayor Curley on June 3, and accepted by the Board of Directors of the Boston Elevated Railway Company on June 3. On June 12, plan numbered 17134, prepared by this department, showing the proposed alterations and extensions, was agreed to by representatives of the Boston Elevated Railway Company and approved for submission to the Department of Public Utilities of the Commonwealth, in accordance with the provisions of the Act, and after hearing was approved by that department on June 19. The contract (see Appendix B) for the use of the premises was executed by the City and by the Boston Elevated Railway on June 30, and the actual work of construction was begun by His Honor Mayor Curley on July 21.

The work to be done under plan numbered 17134 provided for an extension of the subway from Governor Square out Beacon Street to about 200 feet east of the bridge over the tracks of the Boston & Albany Railroad, and out Commonwealth Avenue to about 200 feet east of Blandford Street, and the cost of this work for rental purposes was limited to \$3,100,000.

His Honor Mayor Curley advocated strongly at that time that the Beacon Street Extension be carried to St. Mary's Street but this could not be done in view of the limit of cost fixed by the Legislature. However, following a number of conferences with representatives of the Boston Elevated Railway, a further extension was agreed upon which will bring the Beacon Street Extension to a point west of Audubon Road and will provide that the incline leading therefrom shall reach the

surface of the street at a point approximately 30 feet west from the westerly side line of St. Mary's Street, the agreement further providing that the cost of \$3,100,000, as originally limited, should be increased by the sum of \$1,835,000 thereby fixing a new limit of \$4,935,000 for the entire extension.

The necessary approvals required on the part of the Department of Public Utilities and of the City and the Boston Elevated Railway Company were secured, and the work will now be constructed in accordance with the plan originally urged by this department.

The removal of the surface tracks in Governor Square will not only benefit the one hundred thousand daily passengers on the trolley cars who have been subject to constant and irritating delays at this intersection, but will also make possible a more flexible handling of motor car traffic entering and leaving the City. Underpasses will permit the use of the station from entrances in the sidewalks and allow free passage to pedestrians crossing the street.

This extension has been laid out in such a way as to make it possible to adapt the Boylston Street Subway to rapid transit development of the future.

EAST BOSTON VEHICULAR TUNNEL.

This department in its previous report stated, "No work of construction under the approved plans [plans numbered T. T. 8-9-10] was commenced in view of the request of His Honor the Mayor [Malcolm E. Nichols] for the modification of the plans in accordance with the suggestions of a conference committee which had been appointed by him."

On January 2 the department abandoned plans numbered T. T. 8-9-10 and prepared plans numbered T. T. 15-16-17 containing the modifications suggested by the conference committee and submitted these plans to His Honor Mayor Nichols for approval and his approval was given.

Construction of the tunnel, however, did not proceed immediately for the reason that early in January His Honor Mayor Curley, upon the insistence of advocates of a bridge in place of a tunnel, called a conference to consider the advisability of the bridge suggestion. This conference was attended by the Division of Metropolitan Planning, the City Planning Board, the Finance Commission and the Transit Department. This department expressed strong objection to the substitution

of a bridge for a tunnel and particularly stressed the difficulty of obtaining from the War Department the necessary approval of a bridge calling for a clearance less than that which would project the Boston end of the bridge into the very heart of the business section of the city. To determine the question of clearance, His Honor Mayor Curley directed this department to communicate with the Federal Authorities.

For the purpose of settling the merits of the tunnel-bridge controversy raised at the conference, His Honor Mayor Curley petitioned the Legislature for authority to amend the tunnel act by providing for a tunnel or bridge in the alternative, and in order that no time might be lost in the event that the bridge suggestion were eliminated, instructed this department to proceed with its tunnel plans.

The Legislature declined to consider the proposed amendment, whereupon His Honor Mayor Curley immediately expressed his preference for the tunnel location plan, identified as "Route D", originally presented by this department, and on April 16, the department voted that the location as shown on plans numbered T. T. 15-16-17 be abandoned and that the location of the tunnel as shown on plan numbered T. T. 20 be approved. On the following day this plan was submitted to His Honor Mayor Curley and approved by him.

The necessary permit on the part of the Department of Public Works of the Commonwealth was issued on May 6 and approved by His Excellency the Governor and Council on May 7, and the permit from the Federal Government was issued through the Secretary of War on May 8, 1930.

The land required for the entrances, approaches, ventilating plants, shafts and the right of way of the tunnel has been acquired by eminent domain and awards for damages therefor made by this department, such land takings involving about 225 parcels. Approximately 75% of the awards made for the takings in the vicinity of Dock Square, North Street and Hanover Street for the Boston approach of the tunnel have been accepted by the former owners, and of the takings made for the East Boston entrance and approach, over 60% of the awards have been accepted and about 20% of the remainder are in process of settlement.

The greater number of the buildings taken for the approach and shaft on the East Boston side have been razed and it is expected that the actual construction work on the tunnel will

commence early in the coming year. It is now being planned to advertise for bids in the early part of the coming March.

The appropriation fixed by the Legislature, namely; \$16,000,000, is the largest in the history of the city for a single project of this character and it is estimated that of this amount about \$11,000,000 will be expended for construction and equipment.

ORGANIZATION OF COMMISSION.

On June 26, James B. Noyes resigned as Transit Commissioner and was succeeded by Arthur B. Corbett. Mr. Noyes had served for many years as a member of the Transit Department and of its predecessor, the Transit Commission, and upon his resignation the following was ordered placed upon the records of the department:

"James B. Noyes served as a member of the Boston Transit Commission, the immediate predecessor of the Transit Department, from July 15, 1909, to June 30, 1918, when the term of the Boston Transit Commission expired by limitation and its powers and duties were transferred to the Transit Department of the City of Boston.

He was appointed a commissioner of the Transit Department on July 6, 1926, and remained in that position until his resignation on June 26, 1930.

The Board desires to record this expression of its appreciation of a public service performed for nearly thirteen years in the planning and constructing of the tunnel and subway system of Boston.

In the many varied and complicated problems which have presented themselves in our work, his high order of intelligence, prudent advice and sound judgment have been of unquestionable value to his colleagues.

He brought to the discharge of his duties the virtues of honesty, integrity and dignity, which found expression in the promotion of the interests of the public, and commanded our esteem.

Our genuine regret at his going does not prevent us from wishing him the fullest measure of health, happiness and success."

DORCHESTER TUNNEL.

The department gave its approval to the Boston Elevated Railway Company, as lessee of the Dorchester Tunnel, for alterations in the Summer Street Lobby of the Dorchester Tunnel in connection with an opening between the tunnel lobby and the basement of the Jordan Marsh Company, by

which direct entrance is provided from the Jordan Marsh Store to the Summer Station of the Dorchester Tunnel as well as show windows looking on to the station platform.

DORCHESTER RAPID TRANSIT.

A stairway and platform at Butler Street on the Dorchester Rapid Transit High Speed trolley line was authorized by the department at an estimated cost of \$13,695.

Repairs consisting of repainting the old steel work and replanking the bridge which carries Adams Street over the Dorchester Rapid Transit Extension tracks have been started by the department and the work of providing an additional platform for a stop at Capen Street on the High Speed trolley line was undertaken.

Canopies over the platforms at Valley Road, Central Avenue, Milton and Cedar Grove Stations have been provided.

BOYLSTON STREET SUBWAY.

At the request of the Boston Elevated Railway Company, the department constructed a sub-station in the rear of the Massachusetts Station between the subway walls and the Boston and Albany Railroad.

This sub-station was built on land originally taken by the city for the Boylston Street Subway and was included as part of the cost of that subway. In accordance with the terms of the Boylston Street Subway Act, the value of land taken therefor and no longer needed for the purposes of a subway was credited against the cost of the subway for the purpose of determining the rental to be paid by the Elevated Company and in the case of this sub-station, the amount of the credit heretofore allowed to the company was reduced by the sum of \$15,000. The estimated cost of erecting the sub-station was \$25,000.

DIVISION OF METROPOLITAN PLANNING.

Under the provisions of Chapter 399 of the Acts of 1923 establishing the Division of Metropolitan Planning, it is provided that of the seven commissioners, one should be an officer of the Transit Department to be designated from time to time by the Chairman thereof.

Upon the resignation of Commissioner James B. Noyes, the Chairman designated Commissioner Arthur B. Corbett to serve thereon.

METROPOLITAN TRANSIT COUNCIL.

The first meeting of the Metropolitan Transit Council, established under the provisions of Chapter 383 of the Acts of 1929, was held in the Office of the Mayor of Boston on December 16.

The organization of the council at this meeting was effected by the choice of James M. Curley, Mayor of Boston, as Chairman, and of Edward H. Larkin, Mayor of Medford, as Secretary.

The Metropolitan Transit Council consists of the Mayors and the Chairmen of the Boards of Selectmen of the cities and towns of the district created under the Act and is made up of the following cities and towns—Arlington, Belmont, Boston, Brookline, Cambridge, Chelsea, Everett, Malden, Medford, Milton, Newton, Revere, Somerville and Watertown. The act further provides that each mayor and each chairman of a board of selectmen shall have one vote for each \$100,000,000, or fraction thereof, of the amount of property as last previously established by the Legislature for their respective cities and towns as a basis of apportionment for state and county taxes, and action shall be only by a two-thirds vote of the total number of votes so authorized. On this basis, of the total number of 40 votes in the Council, Boston is credited with twenty-two, Cambridge three, Brookline, Newton and Somerville two each; the remaining members one each.

Following the business of organization, a report submitted by the Trustees of the Metropolitan Transit District was considered, the recommendations offered in that report being confined to such portions of the Metropolitan Transit District as were in the opinion of the Trustees in greatest need of relief.

The Trustees recommended that the Council petition for legislation granting to the District authority to construct two new Rapid Transit Routes—these routes being designated as Route 1 and Route 2.

Route 1 was described as beginning at or near the junction of South Huntington and Huntington Avenues and following the general line of Huntington Avenue to Stuart Street, thence along Stuart Street to Columbus Avenue, thence along Columbus Avenue and under the Common to a new station to be constructed near the present Park Street Station, thence under Beacon Hill to a connection with the East Boston Tunnel at

Bowdoin Square, thence via the present East Boston Tunnel to Maverick Square, and thence by new construction to a terminal at or near Day Square, East Boston, with provision for a future connection with the Boston, Revere Beach & Lynn Railroad.

Route 2 was described as beginning in the Brighton section of the City west of Harvard Avenue and in general to follow the line of Commonwealth Avenue to Governor Square, thence via the present Boylston Street and Tremont Street subways to a point on Canal Street near the North Station, thence via the present elevated structure and viaduct to Lechmere Square, and thence by new construction along the general line of the Boston and Maine Railroad through Winter Hill and Davis Square to a terminal in North Cambridge or Arlington.

The further recommendation of the Trustees was that the two routes should be constructed in their entirety at the earliest possible date, recognizing, however, that a program as extensive as this could not be carried out immediately, but must be spread over several years. It was the belief of the Trustees that legislation should provide for construction in sections as the Trustees of the district should determine.

The Trustees further recommended that the Metropolitan Transit District be authorized to acquire the Chelsea Division of the Eastern Massachusetts Street Railway either by purchase or by eminent domain.

Action by the Metropolitan Transit Council on these recommendations was postponed until December 22 at which meeting the Council went on record in favor of the legislation as submitted by the Trustees, the vote being in the form of approval of the findings and recommendations of the Trustees contained in its report to the Council on December 12, with a request that the same be submitted to the Legislature together with a bill to carry out the recommendations therein presented.

CHARLES STREET STATION OF THE CAMBRIDGE SUBWAY.

Chapter 444 of the Acts of 1924 authorized an additional station on the Cambridge Subway to be located at or near the junction of Cambridge and Charles Streets, and to be constructed by the Department of Public Utilities of the Commonwealth. The Act further provided that the Department of Public Utilities might arrange to have the Transit Department make the plans for and take charge of the work.

Under this provision and at the request of the Department of Public Utilities, the Transit Department prepared plans and specifications, but no work of construction was undertaken for the reason that the Department of Public Utilities ordered that the work cease as the appropriation fixed by the Legislature was insufficient to permit construction of the station in a manner satisfactory to the Boston Elevated Railway Company, Lessee of the subway.

During the past year, however, an agreement has been reached with the trustees and directors of the Boston Elevated Railway for the construction of a station at this location, the estimated cost of which is \$350,000, and now awaits the approval of the Department of Public Utilities.

This station will provide rapid transit facilities to a section of the city now most difficult of access, and will especially benefit those members of the community who are called upon to visit the great hospitals of this district.

SINKING FUNDS.

The following is the condition of the debt and of the sinking funds for the various divisions of the work of the department at the date of this report, as stated by the City Treasurer:

SUBWAY (INCLUDING ALTERATIONS).

(Debt, \$4,416,000, outside debt limit.)

| | |
|--|-----------------------|
| Amount of fund January 1, 1930 | \$3,417,310 29 |
| Received: | |
| Interest on bank deposits January 1, 1930 | |
| to date | \$1,273 38 |
| Interest on investments January 1, 1930 | |
| to date | 132,970 00 |
| Revenue, etc., January 1, 1930 to date | 545 00 |
| | <hr/> |
| | 134,788 38 |
| | <hr/> |
| | <u>\$3,552,098 67</u> |

CHARLESTOWN BRIDGE, No. 1.

(Debt, \$750,000, inside debt limit.)

| | |
|---|--------------|
| Amount of fund January 1, 1930 | \$575,424 12 |
| Received: | |
| Interest on bank deposits January 1, 1930 | |
| to date | \$502 88 |
| | <hr/> |
| Carried forward | \$502 88 |
| | <hr/> |
| | \$575,424 12 |

TRANSIT DEPARTMENT.

11

| | | |
|---|-----------|---------------------|
| <i>Brought forward</i> | \$502 88 | \$575,424 12 |
| Interest on investments January 1, 1930 | | |
| to date | 22,440 00 | |
| Revenue, etc., January 1, 1930 to date | 7,228 31 | |
| Appreciation of investments January 1, 1930 to date | 1,100 80 | |
| Appropriation for debt January 1, 1930 to date | 329 00 | |
| | <hr/> | 31,600 99 |
| | | <hr/> |
| | | \$607,025 11 |
| Paid: | | |
| Interest on investments purchased January 1, 1930 to date | | 71 11 |
| | | <hr/> |
| | | <u>\$606,954 00</u> |

CHARLESTOWN BRIDGE, No. 2.

(Debt, \$665,000, outside debt limit.)

| | | |
|---|--------------|---------------------|
| Amount of fund January 1, 1930 | \$627,537 88 | |
| Received: | | |
| Interest on bank deposits January 1, 1930 to date | \$421 95 | |
| Interest on investments January 1, 1930 to date | 24,390 00 | |
| | <hr/> | 24,811 95 |
| | | <hr/> |
| | | <u>\$652,349 83</u> |

BOSTON TUNNEL AND SUBWAY.

(Debt, \$8,370,700, outside debt limit.)

| | | |
|---|----------------|-----------------------|
| Amount of fund January 1, 1930 | \$3,656,794 87 | |
| Received: | | |
| Interest on bank deposits January 1, 1930 to date | \$2,455 52 | |
| Interest on investments January 1, 1930 to date | 143,242 26 | |
| Revenue, etc., January 1, 1930 to date | 63,907 00 | |
| | <hr/> | 209,604 78 |
| | | <hr/> |
| | | \$3,866,399 65 |
| Paid: | | |
| Interest on investments purchased January 1, 1930 to date | \$1,881 79 | |
| Premium on investments purchased January 1, 1930 to date | 8,020 46 | |
| | <hr/> | 9,902 25 |
| | | <hr/> |
| | | <u>\$3,856,497 40</u> |

BOYLSTON STREET SUBWAY.

(Debt, \$5,423,000, outside debt limit.)

| | |
|--|---------------------|
| Amount of fund January 1, 1930 | \$136,510 53 |
| Received: | |
| Interest on bank deposits January 1, 1930 | |
| to date | \$618 79 |
| Interest on investments January 1, 1930 | |
| to date | 4,802 50 |
| Revenue, etc., January 1, 1930 to date | 27,157 59 |
| | <u>32,578 88</u> |
| | <u>\$169,089 41</u> |

CAMBRIDGE CONNECTION.

(Debt, \$1,648,000, outside debt limit.)

| | |
|--|---------------------|
| Amount of fund January 1, 1930 | \$419,754 51 |
| Received: | |
| Interest on bank deposits January 1, 1930 | |
| to date | \$669 21 |
| Interest on investments January 1, 1930 | |
| to date | 16,615 00 |
| Revenue, etc., January 1, 1930 to date | 15,139 00 |
| | <u>32,423 21</u> |
| | <u>\$452,177 72</u> |

DORCHESTER TUNNEL.

(Debt, \$12,150,000, outside debt limit.)

| | |
|--|---------------------|
| Amount of fund January 1, 1930 | \$639,229 66 |
| Received: | |
| Interest on bank deposits January 1, 1930 | |
| to date | \$1,482 85 |
| Interest on investments January 1, 1930 | |
| to date | 24,695 00 |
| Revenue, etc., January 1, 1930 to date | 81,602 79 |
| | <u>107,780 64</u> |
| | <u>\$747,010 30</u> |

EAST BOSTON TUNNEL.

(Debt, \$3,334,000, outside debt limit.)

| | |
|--|------------------|
| Amount of fund January 1, 1930 | \$1,977,374 47 |
| Received: | |
| Interest on bank deposits January 1, 1930 | |
| to date | \$849 40 |
| Interest on investments January 1, 1930 | |
| to date | 74,562 50 |
| Revenue, etc., January 1, 1930 to date | 5,912 00 |
| | <u>81,323 90</u> |
| Carried forward | \$2,058,698 37 |

| | | |
|---|----------|-----------------------|
| <i>Brought forward</i> | | \$2,058,698 37 |
| Paid: | | |
| Interest on investments purchased January 1, 1930 to date | \$534 38 | |
| Premium on investments purchased January 1, 1930 to date | 1,063 55 | |
| | | <u>1,597 93</u> |
| | | <u>\$2,057,100 44</u> |

EAST BOSTON TUNNEL ALTERATIONS.

(Debt \$3,900,000, outside debt limit.)

| | | |
|---|-----------|--------------------|
| Amount of fund January 1, 1930 | | \$78,946 47 |
| Received: | | |
| Interest on bank deposits January 1, 1930 to date | \$669 61 | |
| Interest on investments January 1, 1930 to date | 1,932 50 | |
| Revenue, etc., January 1, 1930 to date | 10,128 96 | |
| | | <u>12,731 07</u> |
| | | <u>\$91,677 54</u> |

EAST BOSTON TUNNEL EXTENSION.

(Debt, \$2,500,000, outside debt limit.)

| | | |
|---|----------|---------------------|
| Amount of fund January 1, 1930 | | \$243,884 23 |
| Received: | | |
| Interest on bank deposits January 1, 1930 to date | \$585 86 | |
| Interest on investments January 1, 1930 to date | 9,066 00 | |
| Revenue, etc., January 1, 1930 to date | 5,197 13 | |
| Appreciation of investments January 1, 1930 to date | 825 60 | |
| | | <u>15,674 59</u> |
| | | <u>\$259,558 82</u> |

Paid:

| | | |
|---|-------|---------------------|
| Interest on investments purchased January 1, 1930 to date | 53 34 | |
| | | <u>\$259,505 48</u> |

ARLINGTON STATION.

(Debt, \$1,238,000, outside debt limit.)

| | | |
|---|---------|--------------------|
| Amount of fund January 1, 1930 | | \$10,698 45 |
| Received: | | |
| Interest on bank deposits January 1, 1930 to date | \$78 72 | |
| Interest on investments January 1, 1930 to date | 320 00 | |
| | | <u>398 72</u> |
| | | <u>\$11,097 17</u> |

HYDE PARK STREET RAILWAY.

(Debt, \$322,000, outside debt limit.)

| | | |
|---|-------------|--------------------|
| Amount of fund January 1, 1930 | \$54,311 00 | |
| Received: | | |
| Interest on bank deposits January 1, 1930 | | |
| to date | \$225 77 | |
| Interest on investments January 1, 1930 | | |
| to date | 1,457 50 | |
| Appropriation for debt January 1, 1930 | | |
| to date | 8,486 00 | |
| | | <u>10,169 27</u> |
| | | <u>\$64,480 27</u> |

DORCHESTER RAPID TRANSIT.

(Debt, \$10,660,000, outside debt limit.)

| | | |
|--|-------------|--|
| Amount of fund January 1, 1930 | — | |
| Received: | | |
| Revenue, etc., January 1, 1930 to date | \$44,904 59 | |

TREMONT STREET SUBWAY ALTERATIONS — ACTS 1924 — CHAPTER 120.

(Debt, \$65,000, outside debt limit.)

(No Fund.)

BOYLSTON STREET SUBWAY — ACTS 1930 — CHAPTER 394.

(Debt, \$700,000, outside debt limit.)

(No Fund.)

TRAFFIC TUNNEL.

(Debt, \$4,050,000, outside debt limit.)

(No Fund.)

EAST BOSTON TUNNEL ALTERATIONS — ACTS 1924 — CHAPTER 120.

(Debt \$20,000, outside debt limit.)

(No Fund.)

RENTAL BILLS RENDERED TO THE BOSTON
ELEVATED RAILWAY COMPANY.

The following is a statement of the bills rendered for rental of the various tunnels and subways:

TREMONT STREET SUBWAY.

| | | |
|----------------------------------|----------------|--------------------|
| March 31, 1930: | | |
| Net cost of subway | \$4,157,026 48 | |
| Rental for one quarter | | \$46,766 55 |
| Alterations: net cost | 242,673 93 | |
| Rental for one quarter | | 2,730 08 |
| June 30, 1930: | | |
| Net cost of subway | 4,159,473 61 | |
| Rental for one quarter | | 46,794 08 |
| Carried forward | | <u>\$96,290 71</u> |

| | | |
|----------------------------------|--------------|---------------------|
| <i>Brought forward</i> | | \$96,290 71 |
| Alterations: net cost | \$242,673 93 | |
| Rental for one quarter | | 2,730 08 |
| September 30, 1930: | | |
| Net cost of subway | 4,160,284 32 | |
| Rental for one quarter | | 46,803 20 |
| Alterations: net cost | 242,673 93 | |
| Rental for one quarter | | 2,730 08 |
| December 31, 1930: | | |
| Net cost of subway | 4,160,859 65 | |
| Rental for one quarter | | 46,809 67 |
| Alterations: net cost | 242,673 93 | |
| Rental for one quarter | | 2,730 08 |
| Total | | <u>\$198,093 82</u> |

WASHINGTON STREET TUNNEL.

| | | |
|----------------------------------|----------------|---------------------|
| March 31, 1930: | | |
| Net cost of tunnel | \$7,946,250 32 | |
| Rental for one quarter | | \$89,395 32 |
| June 30, 1930: | | |
| Net cost of tunnel | 7,946,544 54 | |
| Rental for one quarter | | 89,398 63 |
| September 30, 1930: | | |
| Net cost of tunnel | 7,946,608 35 | |
| Rental for one quarter | | 89,399 35 |
| December 31, 1930: | | |
| Net cost of tunnel | 7,946,614 49 | |
| Rental for one quarter | | 89,399 41 |
| Total | | <u>\$357,592 71</u> |

CAMBRIDGE CONNECTION.

| | | |
|----------------------------------|----------------|--------------------|
| March 31, 1930: | | |
| Net cost of connection | \$1,652,035 02 | |
| Rental for one quarter | | \$20,134 18 |
| June 30, 1930: | | |
| Net cost of connection | 1,652,209 43 | |
| Rental for one quarter | | 20,136 30 |
| September 30, 1930: | | |
| Net cost of connection | 1,652,371 93 | |
| Rental for one quarter | | 20,138 28 |
| December 31, 1930: | | |
| Net cost of connection | 1,652,624 16 | |
| Rental for one quarter | | 20,141 36 |
| Total | | <u>\$80,550 12</u> |

BOYLSTON STREET SUBWAY.

| | | |
|----------------------------------|----------------|---------------------|
| March 31, 1930: | | |
| Net cost of subway | \$5,269,583 84 | |
| Rental for one quarter | | \$59,282 82 |
| June 30, 1930: | | |
| Net cost of subway | 5,284,860 66 | |
| Rental for one quarter | | 59,454 68 |
| September 30, 1930: | | |
| Net cost of subway | 5,290,927 84 | |
| Rental for one quarter | | 59,522 94 |
| December 31, 1930: | | |
| Net cost of subway | 5,293,765 88 | |
| Rental for one quarter | | 59,554 87 |
| Total | | <u>\$237,815 31</u> |

EAST BOSTON TUNNEL EXTENSION.

| | | |
|--------------------------------|----------------|---------------------|
| March 31, 1930: | | |
| Net cost of extension | \$2,342,728 13 | |
| Rental for one quarter | | \$26,355 69 |
| June 30, 1930: | | |
| Net cost of extension | 2,342,961 79 | |
| Rental for one quarter | | 26,358 32 |
| September 30, 1930: | | |
| Net cost of extension | 2,343,408 51 | |
| Rental for one quarter | | 26,363 35 |
| December 31, 1930: | | |
| Net cost of extension | 2,343,942 75 | |
| Rental for one quarter | | 26,369 36 |
| Total . . . | | <u>\$105,446 72</u> |

EAST BOSTON TUNNEL.

| | | |
|--------------------------------|----------------|---------------------|
| March 31, 1930: | | |
| Net cost of tunnel | \$3,398,988 91 | |
| Rental for one quarter | | \$38,238 63 |
| June 30, 1930: | | |
| Net cost of tunnel | 3,399,638 04 | |
| Rental for one quarter | | 38,245 93 |
| September 30, 1930: | | |
| Net cost of tunnel | 3,400,092 61 | |
| Rental for one quarter | | 38,251 04 |
| December 31, 1930: | | |
| Net cost of tunnel | 3,400,169 61 | |
| Rental for one quarter | | 38,251 91 |
| Total . . . | | <u>\$152,987 51</u> |

HYDE PARK STREET RAILWAY.

| | | |
|--------------------------------|--------------|--------------------|
| March 31, 1930: | | |
| Net cost of premises | \$231,099 45 | |
| Rental for one quarter | | \$2,599 87 |
| June 30, 1930: | | |
| Net cost of premises | 231,099 45 | |
| Rental for one quarter | | 2,599 87 |
| September 30, 1930: | | |
| Net cost of premises | 230,799 45 | |
| Rental for one quarter | | 2,596 49 |
| December 31, 1930: | | |
| Net cost of premises | 231,099 45 | |
| Rental for one quarter | | 2,599 87 |
| Total . . . | | <u>\$10,396 10</u> |

DORCHESTER TUNNEL.

| | | |
|--------------------------------|-----------------|---------------------|
| March 31, 1930: | | |
| Net cost of tunnel | \$12,167,758 44 | |
| Rental for one quarter | | \$136,887 28 |
| June 30, 1930: | | |
| Net cost of tunnel | 12,193,562 38 | |
| Rental for one quarter | | 137,177 58 |
| September 30, 1930: | | |
| Net cost of tunnel | 12,193,879 98 | |
| Rental for one quarter | | 137,181 15 |
| December 31, 1930: | | |
| Net cost of tunnel | 12,193,883 81 | |
| Rental for one quarter | | 137,181 19 |
| Total . . . | | <u>\$548,427 20</u> |

ARLINGTON STATION.

| | | |
|----------------------------------|----------------|--------------------|
| March 31, 1930: | | |
| Net cost of station | \$1,219,958 65 | |
| Rental for one quarter | | \$13,724 54 |
| June 30, 1930: | | |
| Net cost of station | 1,219,958 65 | |
| Rental for one quarter | | 13,724 54 |
| September 30, 1930: | | |
| Net cost of station | 1,219,958 65 | |
| Rental for one quarter | | 13,724 54 |
| December 31, 1930: | | |
| Net cost of station | 1,219,958 65 | |
| Rental for one quarter | | 13,724 54 |
| Total | | <u>\$54,898 16</u> |

EAST BOSTON TUNNEL ALTERATIONS.

| | | |
|----------------------------------|----------------|---------------------|
| March 31, 1930: | | |
| Net cost of premises | \$3,782,406 86 | |
| Rental for one quarter | | \$42,552 08 |
| June 30, 1930: | | |
| Net cost of premises | 3,792,568 44 | |
| Rental for one quarter | | 42,666 39 |
| September 30, 1930: | | |
| Net cost of premises | 3,797,384 54 | |
| Rental for one quarter | | 42,720 58 |
| December 31, 1930: | | |
| Net cost of premises | 3,802,712 34 | |
| Rental for one quarter | | 42,780 52 |
| Total | | <u>\$170,719 57</u> |

DORCHESTER RAPID TRANSIT.

| | | |
|----------------------------------|-----------------|---------------------|
| March 31, 1930: | | |
| Value of premises | \$10,648,509 31 | |
| Rental for one quarter | | \$123,437 39 |
| June 30, 1930: | | |
| Value of premises | 10,721,788 99 | |
| Rental for one quarter | | 120,620 13 |
| September 30, 1930: | | |
| Value of premises | 10,751,473 24 | |
| Rental for one quarter | | 120,954 08 |
| December 31, 1930: | | |
| Value of premises | 10,663,631 10 | |
| Rental for one quarter | | 116,126 41 |
| Total | | <u>\$481,138 01</u> |

TOTALS.

| | |
|--|-----------------------|
| Tremont Street Subway | \$198,093 82 |
| Washington Street Tunnel | 357,592 71 |
| Cambridge Connection | 80,550 12 |
| Boylston Street Subway | 237,815 31 |
| East Boston Tunnel Extension | 105,446 72 |
| Dorchester Tunnel | 548,427 20 |
| Arlington Station | 54,898 16 |
| East Boston Tunnel | 152,987 51 |
| Hyde Park Street Railway | 10,396 10 |
| East Boston Tunnel Alterations | 170,719 57 |
| Dorchester Rapid Transit | 481,138 01 |
| | <u>\$2,398,065 23</u> |

STATEMENT OF EXPENSES.

The following is a classified statement of the expenses of the department for the year ending December 31, 1930:

EAST BOSTON TUNNEL.

SECTION B.

| | |
|------------------------|-----------------|
| Construction Expenses: | |
| Labor | <u>\$473 53</u> |

BOSTON TUNNEL AND SUBWAY.

Engineering Expenses:

Stationery—Sup-
plies

Cr. \$1 00 —

SECTION 3.

Construction Expenses:

| | | |
|-------------------------|---------------|--------|
| Construction | \$1 95 | |
| Essex Station | <u>376 75</u> | |
| | | 378 70 |

SECTION 4.

Engineering Expenses:

| | |
|---------------------------|------|
| Skilled Service | 9 22 |
|---------------------------|------|

SECTION 6.

Construction Expenses:

| | |
|------------------------|------|
| Construction | 1 95 |
|------------------------|------|

SECTION 8.

Engineering Expenses:

| | |
|---------------------------|-------|
| Skilled Service | 17 20 |
|---------------------------|-------|

SECTION 9.

Engineering Expenses:

| | | |
|---------------------------|---------------|-----------------|
| Skilled Service | <u>158 28</u> | |
| | | <u>\$564 35</u> |

CAMBRIDGE CONNECTION.

Engineering Expenses:

| | |
|---------------------------|----------|
| Skilled Service | \$336 91 |
|---------------------------|----------|

SECTION 2.

Construction Expenses:

| | | |
|------------------------|---------------|-----------------|
| Construction | <u>527 47</u> | |
| | | <u>\$864 38</u> |

DORCHESTER TUNNEL.

Engineering Expenses:

| | |
|------------------------------------|---------|
| Stationery—Sup- plies | \$11 45 |
|------------------------------------|---------|

SECTION A.

Engineering Expenses:

| | |
|---------------------------|---------|
| Skilled Service | \$91 28 |
|---------------------------|---------|

Construction Expenses:

| | | |
|-----------------|---------------|--------|
| Labor | <u>100 25</u> | |
| | | 191 53 |

| | |
|---------------------------|----------|
| Carried forward | \$202 98 |
|---------------------------|----------|

Brought forward \$202 98

SECTION B.

Engineering Expenses:
Skilled Service 38 48

SECTION G.

Engineering Expenses:
Stationery—Sup-
plies \$3 65
Construction Expenses:
Construction \$35 43
Labor 1,476 95
Tools 19 90

1,532 28
1,535 93

SECTION J.

Engineering Expenses:
Skilled Service \$42 27
Construction Expenses:
Construction 101 62

143 89

SECTION K.

Engineering Expenses:
Professional Ad-
vice \$250 00
Skilled Service 852 81
Stationery—Sup-
plies 1 50

\$1,104 31
Construction Expenses:
Coleman Bros., Inc.
(Cont. 784) \$25,000 00
Property Damages-
Takings 5,000 00

30,000 00
31,104 31

\$33,025 59

BOYLSTON STREET SUBWAY.

Engineering Expenses:
Skilled Service \$94 70
Stationery—Sup-
plies 8 32

\$103 02
Stenographers Cr. 60 68

\$42 34

SECTION 2.

Engineering Expenses:
Advertising \$10 75
Skilled Service 5,914 19
Stationery—Sup-
plies 11 60

\$5,936 54
Construction Expenses:
Construction \$16,265 05
Labor 3,949 26

\$20,214 31

\$5,936 54
\$42 34

| | | | | |
|-------------------------|-------------|------------|-----------|--------------------|
| <i>Brought forward,</i> | \$20,214 31 | \$5,936 54 | \$42 34 | |
| Lighting . . . | 142 34 | | | |
| Tools . . . | 40 50 | | | |
| | <hr/> | 20,397 15 | | |
| | | | 26,333 69 | |
| | | | | <u>\$26,376 03</u> |

EAST BOSTON TUNNEL ALTERATIONS.

| | | | | |
|-----------------------------|------------|--|----------|-------------------|
| Engineering Expenses: | | | | |
| Skilled Service | \$633 93 | | | |
| Stationery—Supplies | 25 49 | | | |
| | <hr/> | | \$659 42 | |
| Construction Expenses: | | | | |
| Construction | \$627 11 | | | |
| Labor | 4,825 09 | | | |
| Tools | 173 48 | | | |
| | <hr/> | | | |
| | \$5,625 68 | | | |
| Field Supplies | Cr. 273 22 | | | |
| | <hr/> | | 5,352 46 | |
| | | | | <u>\$6,011 88</u> |

HYDE PARK STREET RAILWAY.

| | | | | |
|----------------------------------|----------------|--|----------------|--|
| Construction Expenses: | | | | |
| Property Damages—Takings | Cr. \$1,200 00 | | | |
| Stationery—Supplies | 1 50 | | | |
| | <hr/> | | Cr. \$1,198 50 | |

TREMONT STREET SUBWAY ALTERATIONS—ACTS 1924.

| | | | | |
|---|------------|------------|------------|--|
| Engineering Expenses: | | | | |
| Skilled Service | \$1,212 29 | | | |
| Adams Station: | | | | |
| Engineering Expenses: | | | | |
| Skilled Service | 25 54 | | | |
| Boylston Station: | | | | |
| Construction Expenses: | | | | |
| Autos | \$3 29 | | | |
| Construction | 27 62 | | | |
| Labor | 514 48 | | | |
| Supplies—Field | 10 31 | | | |
| | <hr/> | | 552 70 | |
| Park Street Station: | | | | |
| Construction Expenses: | | | | |
| Labor | 270 10 | | | |
| Park Street Station (Changing Columns): | | | | |
| Engineering Expenses: | | | | |
| Skilled Service, \$1,194 06 | | | | |
| Stationery—Supplies | 8 44 | | | |
| | <hr/> | \$1,202 50 | | |
| Construction Expenses: | | | | |
| Construction | \$822 20 | | | |
| Labor | 6,598 95 | | | |
| Light—Power | 198 25 | | | |
| Supplies—Field, | 128 51 | | | |
| | <hr/> | | | |
| <i>Carried forward,</i> | \$7,747 91 | \$1,202 50 | \$2,060 63 | |

| | | | | |
|------------------|------------|------------|------------|--------------------|
| Brought forward, | \$7,747 91 | \$1,202 50 | \$2,060 63 | |
| Teaming . . . | 10 00 | | | |
| Tools . . . | 151 68 | | | |
| | <hr/> | 7,909 59 | | |
| | | | 9,112 09 | |
| | | | <hr/> | <u>\$11,172 72</u> |

EAST BOSTON TUNNEL ALTERATIONS—ACTS 1924.

Miscellaneous Expenses:

| | | |
|--------------------------------|----------|----------|
| Labor . . . | \$125 13 | |
| Stationery—Sup- plies . . . | 60 | |
| | <hr/> | \$125 73 |

Atlantic Avenue Station:

| | | |
|--------------------------------|--------|-----------------|
| Construction . . | \$7 50 | |
| Labor . . . | 715 35 | |
| Skilled Service . . | 66 32 | |
| Stationery—Sup- plies . . . | 2 07 | |
| Tools . . . | 34 50 | |
| | <hr/> | 825 74 |
| | | <u>\$951 47</u> |

EAST BOSTON TUNNEL EXTENSION.

SECTION G.

Engineering Expenses:

| | |
|---------------------------|---------|
| Skilled Service | \$17 48 |
|---------------------------|---------|

Construction Expenses:

| | | |
|--------------------|--------|---------|
| Construction . . | \$1 64 | |
| Field Supplies . . | 1 59 | |
| Labor . . . | 35 25 | |
| | <hr/> | 38 48 |
| | | \$55 96 |

SECTION H.

Engineering Expenses:

| | |
|------------------------------------|------------|
| Stationery—Sup- plies | Cr. \$3 47 |
|------------------------------------|------------|

Construction Expenses:

| | | |
|------------------|----------|----------|
| Construction . . | \$27 49 | |
| Labor . . . | 1,278 21 | |
| Tools . . . | 16 45 | |
| | <hr/> | 1,322 15 |
| | | 1,318 68 |

SECTION J.

Engineering Expenses:

| | | |
|---------------------------|-------|-------------------|
| Skilled Service | 12 08 | |
| | <hr/> | <u>\$1,386 72</u> |

DORCHESTER RAPID TRANSIT.

General Expenses:

| | |
|-----------------------------------|----------|
| Clerks and Ste- nographers . . | \$609 10 |
| Commissioners . . | 1,750 00 |
| Conveyancer . . | 332 81 |
| Lighting . . . | 35 64 |
| Printing . . . | 28 65 |
| | <hr/> |

Carried forward, \$2,756 20

| | | |
|--------------------------------|-------------------|--------------|
| Brought forward, | \$2,756 20 | |
| Rental . . . | 638 00 | |
| Secretary . . | 534 64 | |
| Stationery—Sup- plies . . . | 68 28 | |
| Telephone—Tel- egraph . . . | 209 94 | |
| | <u>\$4,207 06</u> | |
| Interest . . . | 99,629 43 | |
| | | \$103,836 49 |
| Engineering Expenses: | | |
| Autos . . . | \$27 53 | |
| Chief Engineer . | 656 25 | |
| Clerks . . . | 1,080 48 | |
| Labor . . . | 2,291 86 | |
| Lighting . . . | 44 47 | |
| Professional Ad- vice . . . | 1,075 00 | |
| Rental . . . | 638 04 | |
| Skilled Service . | 3,262 25 | |
| Stationery—Sup- plies . . . | 14 18 | |
| Stenographers . | 297 34 | |
| Telephone—Tel- egraph . . . | 48 47 | |
| | <u>9,435 87</u> | |

SECTION 1.

| | | |
|------------------------------------|--------------------|-----------|
| Columbia Station Overpass . . . | \$909 20 | |
| Miscellaneous Expenses: | | |
| Professional Ad- vice . . . | \$250 00 | |
| Property Dama- ges—Takings, . . | 26,407 52 | |
| Rental—Construc- tion . . . | 386 10 | |
| Skilled Service . | 188 07 | |
| Stationery—Sup- plies . . . | 2 00 | |
| | <u>\$27,233 69</u> | |
| Equipment—Ma- terial . . . Cr. | 5,771 11 | |
| | <u>21,462 58</u> | |
| | | 22,371 78 |

SECTION 2.

| | | |
|---|-----------------|--------------|
| Bridges: | | |
| Adams Street . . | \$557 42 | |
| Dorchester Ave- nue . . . | 421 03 | |
| | <u>\$978 45</u> | |
| Stations: | | |
| Fields Corner Station En- closed Area . . | \$144 29 | |
| Fields Corner Sta- tion . . . | 3,587 12 | |
| | <u>3,731 41</u> | |
| Carried forward . . . | \$4,709 86 | \$135,644 14 |

| | | | |
|---------------------------------|---------------------|--------------|--|
| <i>Brought forward</i> | \$4,709 86 | \$135,644 14 | |
| Miscellaneous Expenses: | | | |
| Acquisition— | | | |
| Shawmut | | | |
| Branch . . . | \$6 79 | | |
| Labor . . . | 62 31 | | |
| Professional Advice . . . | 100 00 | | |
| Property Damages—Takings, . . . | 50 93 | | |
| Rental—Construction . . . | 241 64 | | |
| Skilled Service . . . | 40 67 | | |
| Stationery—Supplies . . . | 1 50 | | |
| | <u>\$503 84</u> | | |
| Equipment—Material . . . | Cr. 1,776 76 | | |
| Field Supplies . . . | Cr. 7 05 | | |
| | <u>Cr. 1,279 97</u> | | |
| | | 3,429 89 | |

SECTION 3.

| | | | |
|---------------------------|---------------------|----------|--|
| Shawmut Station . . . | \$7,280 98 | | |
| Miscellaneous: | | | |
| Acquisition— | | | |
| Shawmut | | | |
| Branch . . . | \$12 51 | | |
| Autos . . . | 5 40 | | |
| Clerk . . . | 60 40 | | |
| Construction . . . | 15 66 | | |
| Filed Supplies . . . | 2 45 | | |
| Labor . . . | 424 87 | | |
| Rental—Construction . . . | 244 36 | | |
| Skilled Service . . . | 163 58 | | |
| Stationery—Supplies . . . | 7 05 | | |
| | <u>\$936 28</u> | | |
| Equipment— | | | |
| Material . . . | Cr. 3,280 73 | | |
| | <u>Cr. 2,344 45</u> | | |
| | | 4,936 53 | |

SECTION 4.

| | | | |
|-------------------------|-------------------|------------|--------------|
| Bridges: | | | |
| Adams Street . . . | \$1,330 57 | | |
| Beale Street . . . | 192 00 | | |
| | <u>\$1,522 57</u> | | |
| Stations: | | | |
| Ashmont . . . | \$389 05 | | |
| Cedar Grove . . . | 3,178 21 | | |
| | <u>3,567 26</u> | | |
| Miscellaneous Expenses: | | | |
| Acquisition— | | | |
| Shawmut | | | |
| Branch . . . | \$10 15 | | |
| Construction . . . | 103 22 | | |
| Labor . . . | 352 13 | | |
| | <u>\$465 50</u> | | |
| <i>Carried forward,</i> | \$465 50 | \$5,089 83 | \$144,010 56 |

| | | | |
|--------------------------------|-------------------|---------------|--------------|
| <i>Brought forward,</i> | \$465 50 | \$5,089 83 | \$144,010 56 |
| Professional Advice | 1,850 00 | | |
| Property Dam-ages—Takings, | 550 00 | | |
| Rental—C o n-struction | 259 20 | | |
| Skilled Service | 298 87 | | |
| Stationery—Supplies | 8 36 | | |
| Tools | 6 15 | | |
| | <u>\$3,438 08</u> | | |
| Equipment — | | | |
| Material . . . Cr. | 2,664 23 | | |
| | | <u>773 85</u> | |
| | | | 5,863 68 |

SECTION 5A.

M. F. Gaddis (Contract 920) . \$10,000 00
Miscellaneous Expenses:

| | | | |
|--------------------------------|------------------|--|-----------|
| Acquisition — | | | |
| Shawmut Branch | \$8 90 | | |
| Construction | 17 10 | | |
| Equipment — | | | |
| Material | 19,013 21 | | |
| Labor | 452 19 | | |
| Property Dam-ages—Takings | 2,000 00 | | |
| Rental—C o n-struction | 99 92 | | |
| Skilled Service | 462 65 | | |
| Stationery—Supplies | 7 55 | | |
| Field — Supplies | 68 89 | | |
| Tools | 10 00 | | |
| Track Changes | 1,065 93 | | |
| | <u>23,206 34</u> | | |
| | | | 33,206 34 |

SECTION 5B.

William J. Sullivan (Contract 935) \$64,340 27
Stations:

| | | | |
|------------------------|------------|-----------------|--|
| Central Avenue | \$3,372 39 | | |
| Milton Station | 4,503 06 | | |
| | | <u>7,875 45</u> | |
| Field Office: | | | |
| Milton | | 179 70 | |

Miscellaneous Expenses:

| | | | |
|-------------------------|--------------------|--------------------|---------------------|
| Acquisition — | | | |
| Shawmut Branch | \$6 16 | | |
| Autos | 111 39 | | |
| Clerk | 60 40 | | |
| Construction | 2,682 42 | | |
| Equipment — | | | |
| Material | 13,200 65 | | |
| Fuel | 24 70 | | |
| Labor | 3,293 31 | | |
| | <u>\$19,379 03</u> | <u>\$72,395 42</u> | <u>\$183,080 58</u> |
| <i>Carried forward,</i> | \$19,379 03 | \$72,395 42 | \$183,080 58 |

| | | | |
|-------------------------------|------------------|-------------|--------------|
| <i>Brought forward,</i> | \$19,379 03 | \$72,395 42 | \$183,080 58 |
| Lighting | 37 27 | | |
| Professional Advice | 250 00 | | |
| Rental—Construction | 78 32 | | |
| Skilled Service | 1,185 70 | | |
| Stationery—Supplies | 41 54 | | |
| Supplies—Field | 151 56 | | |
| Tools | 46 95 | | |
| Water Pipes | 4,890 20 | | |
| | <u>26,060 57</u> | | |
| | | 98,455 99 | |

SECTION 5C.

| | | | |
|--|------------------|---------------------|--|
| Peerless Construction Co. (Contract 937) | \$11,326 98 | | |
| Stations: | | | |
| Mattapan | \$16,107 51 | | |
| Valley Road | 4,102 16 | | |
| | <u>20,209 67</u> | | |
| Field Office: | | | |
| Mattapan | 56 71 | | |
| Miscellaneous Expenses: | | | |
| Acquisition— | | | |
| Shawmut Branch | \$13 15 | | |
| Autos | 57 54 | | |
| Clerk | 60 41 | | |
| Construction | 3,928 24 | | |
| Equipment— | | | |
| Material | 33,227 76 | | |
| Fuel | 55 00 | | |
| Labor | 2,134 52 | | |
| Lighting | 71 17 | | |
| Professional Advice | 100 00 | | |
| Property Damages—Takings | 1 02 | | |
| Rental—Construction | 40 46 | | |
| Skilled Service | 1,017 05 | | |
| Stationery—Supplies | 68 50 | | |
| Supplies—Field | 167 05 | | |
| Tools | 463 41 | | |
| Water Pipes | 1,420 59 | | |
| | <u>42,825 87</u> | | |
| | | 74,419 23 | |
| | | <u>\$355,955 80</u> | |

TRAFFIC TUNNEL.

| | |
|----------------------------------|--------------------|
| General Expenses: | |
| Chief Clerk | \$1,227 36 |
| Clerks—Stenographers | 5,003 81 |
| Commissioners | 22,250 00 |
| Conveyancer | 3,348 82 |
| Secretary | 5,823 02 |
| Office—Furniture | 372 80 |
| Lighting | 429 30 |
| | <u>\$38,455 11</u> |
| <i>Carried forward</i> | |

| | | | |
|-----------------------------|--------------|--------------|----------------|
| <i>Brought forward</i> | | \$38,455 11 | |
| Office — Printing | | 390 40 | |
| Rentals | | 8,111 97 | |
| Repairs | | 59 00 | |
| Stationery — Supplies | | 1,417 26 | |
| Telephone — Telegraph | | 2,210 00 | |
| | | <hr/> | |
| | | \$50,643 74 | |
| Transferred to | | | |
| Boylston St. Subway — Chap. | | | |
| 394 — Acts 1930 | 14,003 48 | | |
| | <hr/> | | \$36,640 26 |
| Engineering Expenses: | | | |
| Hanover Street Field Office | \$882 88 | | |
| North Street Field Office | 47 31 | | |
| Advertising | 152 10 | | |
| Autos | 2,300 90 | | |
| Borings | 2,600 61 | | |
| Chief Engineer | 6,493 75 | | |
| Clerks | 5,535 90 | | |
| Construction | 21 92 | | |
| Furniture | 453 56 | | |
| Fuel | 224 96 | | |
| Instruments | 284 25 | | |
| Labor | 30,082 67 | | |
| Lighting | 338 34 | | |
| Professional Advice | 45,134 94 | | |
| Property Damages — Takings | 2,137,118 67 | | |
| Property Repairs | 746 76 | | |
| Rentals | 6,216 16 | | |
| Rental — Construction | 2,591 68 | | |
| Repairs | 42 87 | | |
| Skilled Service | 87,753 54 | | |
| Stationery — Supplies | 3,074 02 | | |
| Stenographers | 2,027 57 | | |
| Supplies — Field | 353 38 | | |
| Telephone — Telegraph | 467 60 | | |
| Tools | 87 73 | | |
| | <hr/> | | |
| | | 2,335,034 07 | |
| Interest | | 1,062 50 | |
| | | <hr/> | |
| | | | \$2,372,736 83 |

BOYLSTON STREET SUBWAY — ACTS 1930.

Proportion General Expenses . . . \$14,003 48

Engineering and Miscellaneous Expenses:

| | |
|---------------------|-----------|
| Advertising | \$92 50 |
| Autos | 59 00 |
| Chief Engineer | 1,850 00 |
| Clerks | 2,856 06 |
| Furniture | 15 00 |
| Inspection | 593 59 |
| Instruments | 174 83 |
| Lighting | 98 85 |
| Printing | 1,041 88 |
| Professional Advice | 2,681 30 |
| Rental | 1,895 82 |
| Repairs | 22 87 |
| Skilled Service | 64,613 27 |

| | | |
|------------------------|-------------|-------------|
| <i>Carried forward</i> | \$75,994 97 | \$14,003 48 |
|------------------------|-------------|-------------|

TRANSIT DEPARTMENT.

27

| | | | |
|---|-------------|--------------|-----------------------|
| <i>Brought forward</i> | \$75,994 97 | \$14,003 48 | |
| Stationery—Supplies | 1,831 66 | | |
| Stenographers | 860 15 | | |
| Telephone—Telegraph | 156 24 | | |
| | | 78,843 02 | |
| Construction Expenses: | | | |
| Autos | \$4,246 60 | | |
| Construction | 96,880 20 | | |
| Field Supplies | 70,125 35 | | |
| Fuel | 471 80 | | |
| Labor | 257,655 76 | | |
| Light—Power | 3,171 18 | | |
| Rental—Yard | 1,195 81 | | |
| Trucking | 17,962 76 | | |
| Tools | 91,509 85 | | |
| Underpinning | 17,294 66 | | |
| | | 560,513 97 | |
| | | | <u>\$653,360 47</u> |
| Increase: | | | |
| East Boston Tunnel | | \$473 53 | |
| Boston Tunnel and Subway | | 564 35 | |
| Cambridge Connection | | 864 38 | |
| Dorchester Tunnel | | 33,025 59 | |
| Boylston Street Subway | | 26,376 03 | |
| East Boston Tunnel Alterations | | 6,011 88 | |
| Hyde Park Street Railway | | Cr. 1,198 50 | |
| Tremont Street Subway Alterations—Acts 1924 | | 11,172 72 | |
| East Boston Tunnel Alterations—Acts 1924, | | 951 47 | |
| East Boston Tunnel Extension | | 1,386 72 | |
| Dorchester Rapid Transit | | 355,955 80 | |
| Traffic Tunnel | | 2,372,736 83 | |
| Boylston Street Subway—Acts 1930 | | 653,360 47 | |
| | | | <u>\$3,461,681 27</u> |

SUMMARY.

| | From beginning of work to Dec. 31, 1929. | Jan. 1, 1930, to Dec. 31, 1930. | Total. |
|--|--|---------------------------------------|----------------|
| Subway—Subway Com- mission | \$14,131 16 | | \$14,131 16 |
| Part of General Ex- penses | 117,550 71 | | 117,550 71 |
| Engineering and Miscel- laneous | 407,475 48 | | 407,475 48 |
| Section One | 239,407 12 | | 239,407 12 |
| Two | 363,605 50 | | 363,605 50 |
| Three | 300,639 36 | | 300,639 36 |
| Three and one- half | 9,355 70 | | 9,355 70 |
| Four | 472,147 31 | | 472,147 31 |
| Five | 387,411 49 | | 387,411 49 |
| Six | 327,541 86 | | 327,541 86 |
| Seven | 231,504 27 | | 231,504 27 |
| Eight | 95,902 06 | | 95,902 06 |
| Eight and one- half | 76,639 47 | | 76,639 47 |
| Nine | 299,452 07 | | 299,452 07 |
| <i>Carried forward</i> | \$3,342,763 56 | | \$3,342,763 56 |

| | From beginning of work to Dec. 31, 1929. | Jan. 1, 1930, to Dec. 31, 1930. | Total. |
|---|--|---------------------------------------|-----------------------|
| <i>Brought forward</i> . . . | \$3,342,763 56 | | \$3,342,763 56 |
| Section Ten . . . | 254,497 88 | | 254,497 88 |
| Eleven . . . | 270,310 57 | | 270,310 57 |
| Interest . . . | 258,575 60 | | 258,575 60 |
| | <u>\$4,126,147 61</u> | | <u>\$4,126,147 61</u> |
| Transfer to Alterations, see 11th report . . . | 4 95 | | 4 95 |
| | <u>\$4,126,142 66</u> | | <u>\$4,126,142 66</u> |
| Alterations — Part of Gen- eral Expenses . . . | \$28,945 53 | | \$28,945 53 |
| Section Three . . . | 2,568 26 | | 2,568 26 |
| Four . . . | 163 42 | | 163 42 |
| Five . . . | 30,233 01 | | 30,233 01 |
| Seven . . . | 178,516 16 | | 178,516 16 |
| Nine . . . | 3 00 | | 3 00 |
| Ten . . . | 534 04 | | 534 04 |
| Interest . . . | 1,905 56 | | 1,905 56 |
| Transfer from subway, see 11th report . . . | 4 95 | | 4 95 |
| | <u>\$242,873 93</u> | | <u>\$242,873 93</u> |
| Charlestown Bridge: Total . . . | \$1,570,197 98 | | \$1,570,197 98 |
| Investigation of Conges- tion of Traffic, etc. . . | \$3,015 92 | | \$3,015 92 |
| East Boston Tunnel — Part of General Ex- penses . . . | \$161,134 78 | | \$161,134 78 |
| Engineering and miscel- laneous . . . | 199,688 73 | | 199,688 73 |
| Section A . . . | 98,869 09 | | 98,869 09 |
| B . . . | 1,489,869 07 | \$473 53 | 1,490,342 60 |
| C . . . | 508,202 77 | | 508,202 77 |
| D . . . | 246,569 26 | | 246,569 26 |
| E . . . | 188,307 72 | | 188,307 72 |
| F . . . | 243,763 23 | | 243,763 23 |
| Interest . . . | 248,156 88 | | 248,156 88 |
| | <u>\$3,384,561 53</u> | <u>\$473 53</u> | <u>\$3,385,035 06</u> |
| Boston Tunnel and Sub- way — Part of Gen- eral Expenses . . . | \$226,547 21 | | \$226,547 21 |
| Engineering and Miscel- laneous . . . | 419,690 59 | Cr. \$1 00 | 419,689 59 |
| Section One . . . | 815,591 24 | | 815,591 24 |
| Two . . . | 614,183 29 | | 614,183 29 |
| Three . . . | 683,842 49 | 378 70 | 684,221 19 |
| Four . . . | 1,205,322 61 | 9 22 | 1,205,331 83 |
| Five . . . | 1,080,127 58 | | 1,080,127 58 |
| Six . . . | 351,822 60 | 1 95 | 351,824 55 |
| Seven . . . | 139,723 14 | | 139,723 14 |
| Eight . . . | 619,092 67 | 17 20 | 619,109 87 |
| Nine . . . | 678,991 95 | 158 28 | 679,150 23 |
| Ten . . . | 142,835 42 | | 142,835 42 |
| <i>Carried forward</i> . . . | \$6,977,770 79 | \$564 35 | \$6,978,335 14 |

| | From beginning of work to Dec. 31, 1929. | Jan. 1, 1930, to Dec. 31, 1930. | Total. |
|--|--|---------------------------------------|------------------------|
| <i>Brought forward</i> | \$6,977,770 79 | \$564 35 | \$6,978,335 14 |
| Section Eleven | 345,493 91 | | 345,493 91 |
| Twelve | 45,417 52 | | 45,417 52 |
| Interest | 648,179 81 | | 648,179 81 |
| | <u>\$8,016,862 03</u> | <u>\$564 35</u> | <u>\$8,017,426 38</u> |
| Cambridge Connection — Part of General Ex- penses | \$67,261 25 | | \$67,261 25 |
| Engineering and Miscel- laneous | 258,505 56 | \$336 91 | 258,842 47 |
| Section One | 590,280 64 | | 590,280 64 |
| Two | 652,548 45 | 527 47 | 653,075 92 |
| Interest | 76,722 00 | | 76,722 00 |
| | <u>\$1,645,317 90</u> | <u>\$864 38</u> | <u>\$1,646,182 28</u> |
| Dorchester Tunnel— Part of General Ex- penses | \$197,392 47 | | \$197,392 47 |
| Engineering and Miscel- laneous | 833,272 33 | \$11 45 | 833,283 78 |
| Section A | 409,633 52 | 191 53 | 409,825 05 |
| B | 885,050 41 | 38 48 | 885,088 89 |
| C | 460,379 33 | | 460,379 33 |
| D | 1,131,501 48 | | 1,131,501 48 |
| E | 2,366,598 58 | | 2,366,598 58 |
| F | 868,444 45 | | 868,444 45 |
| G | 615,245 51 | 1,535 93 | 616,781 44 |
| H | 893,727 73 | | 893,727 73 |
| J | 974,759 58 | 143 89 | 974,903 47 |
| K | 1,320,970 13 | 31,104 31 | 1,352,074 44 |
| Interest | 1,312,320 20 | | 1,312,320 20 |
| | <u>\$12,269,295 72</u> | <u>\$33,025 59</u> | <u>\$12,302,321 31</u> |
| Boylston Street Subway— Part of General Ex- penses | \$104,155 53 | | \$104,155 53 |
| Engineering and Miscel- laneous | 240,040 87 | \$42 34 | 240,083 21 |
| Section One | 763,171 52 | | 763,171 52 |
| Two | 1,233,315 38 | 26,333 69 | 1,259,649 07 |
| Three | 585,564 58 | | 585,564 58 |
| Four | 1,458,935 20 | | 1,458,935 20 |
| Five | 729,141 17 | | 729,141 17 |
| Interest | 320,194 59 | | 320,194 59 |
| | <u>\$5,434,518 84</u> | <u>\$26,376 03</u> | <u>\$5,460,894 87</u> |
| East Boston Tunnel Ex- tension — Part General Expenses | \$38,383 04 | | \$38,383 04 |
| Engineering and Miscel- laneous | 976,250 79 | | 976,250 79 |
| Section G | 336,794 88 | \$55 96 | 336,850 84 |
| H | 673,487 15 | 1,318 68 | 674,805 83 |
| J | 135,724 66 | 12 08 | 135,736 74 |
| Interest | 224,138 91 | | 224,138 91 |
| | <u>\$2,384,779 43</u> | <u>\$1,386 72</u> | <u>\$2,386,166 15</u> |

| | From beginning of work to Dec. 31, 1929. | Jan. 1, 1930, to Dec. 31, 1930. | Total. |
|---|--|---------------------------------------|-----------------------|
| Arlington Station — Part of General Expenses . | \$41,313 26 | | \$41,313 26 |
| Engineering and Miscel- laneous | 72,954 20 | | 72,954 20 |
| Construction | 582,395 17 | | 582,395 17 |
| Extension | 483,005 17 | | 483,005 17 |
| Interest | 55,738 68 | | 55,738 68 |
| | <u>\$1,235,406 48</u> | | <u>\$1,235,406 48</u> |
| East Boston Tunnel Al- terations — Part of General Expenses . | \$75,407 79 | | \$75,407 79 |
| Engineering and Miscel- laneous | 171,959 61 | \$659 42 | 172,619 03 |
| Construction | 3,407,933 76 | 5,352 46 | 3,413,286 22 |
| Interest | 168,217 76 | | 168,217 76 |
| | <u>\$3,823,518 92</u> | <u>\$6,011 88</u> | <u>\$3,829,530 80</u> |
| Hyde Park Street Railway — Part of General Expenses | \$2,195 04 | | \$2,195 04 |
| Engineering and Miscel- laneous | 305,260 98 | * \$1,198 50 | 304,062 48 |
| | <u>\$307,456 02</u> | <u>* \$1,198 50</u> | <u>\$306,257 52</u> |
| Tremont Street Subway Alterations — Acts 1924 Part of General Expenses | \$1,093 59 | | \$1,093 59 |
| Engineering and Miscel- laneous | 819 20 | \$1,212 29 | 2,031 49 |
| Adams Station | 2,401 75 | 25 54 | 2,427 29 |
| Boylston Station | | 552 70 | 552 70 |
| Brattle Street — East- erly Platform | 7,723 72 | | 7,723 72 |
| Hanover Street | 49 10 | | 49 10 |
| Haymarket Station | 15,161 01 | | 15,161 01 |
| Park Street Station — North Platform | 4,899 29 | | 4,899 29 |
| Column Changes | 7,860 68 | 9,112 09 | 16,972 77 |
| General | | 270 10 | 270 10 |
| Scollay Station | 488 40 | | 488 40 |
| Scollay Square Changes — Cambridge and Court Street Widen- ing | 7,311 84 | | 7,311 84 |
| | <u>\$47,808 58</u> | <u>\$11,172 72</u> | <u>\$58,981 30</u> |
| East Boston Tunnel Alter- ations — Acts 1924 — Engineering and Mis- cellaneous | | \$125 73 | \$125 73 |
| Atlantic Station | \$4,401 50 | 825 74 | 5,227 24 |
| East Boston Tunnel | 5,105 13 | | 5,105 13 |
| <i>Carried forward</i> | \$9,506 63 | \$951 47 | \$10,458 10 |

* Decrease.

| | From beginning of work to Dec. 31, 1929. | Jan. 1, 1930, to Dec. 31, 1930. | Total. |
|--|--|---------------------------------------|------------------------|
| <i>Brought forward</i> | \$9,506 63 | \$951 47 | \$10,458 10 |
| Scollay Station | 68 01 | | 68 01 |
| Scollay Square Changes —Cambridge and Court street Widen- ing | 4,656 57 | | 4,656 57 |
| | <u>\$14,231 21</u> | <u>\$951 47</u> | <u>\$15,182 68</u> |
| Dorchester Rapid Transit — Part of General Expenses | \$205,772 61 | \$4,207 06 | \$209,979 67 |
| Engineering and Miscel- laneous | 256,562 58 | 9,435 87 | 265,998 45 |
| Section One | 2,600,176 42 | 22,371 78 | 2,622,548 20 |
| Two | 1,685,388 23 | 3,429 89 | 1,688,818 12 |
| Three | 1,572,007 74 | 4,936 53 | 1,576,944 27 |
| Four | 1,719,224 79 | 5,863 68 | 1,725,088 47 |
| Five | 1,851,440 31 | 206,081 56 | 2,057,521 87 |
| Interest | 544,185 83 | 99,629 43 | 643,815 26 |
| | <u>\$10,434,758 51</u> | <u>\$355,955 80</u> | <u>\$10,790,714 31</u> |
| Traffic Tunnel — Part of General Expenses . . | \$6,708 44 | \$36,640 26 | \$43,348 70 |
| Engineering and Miscel- laneous | 47,287 39 | 2,335,034 07 | 2,382,321 46 |
| Interest | | 1,062 50 | 1,062 50 |
| | <u>\$53,995 83</u> | <u>\$2,372,736 83</u> | <u>\$2,426,732 66</u> |
| Boylston Street Subway — Chap. 394 — Acts 1930 — Part of Gen- eral Expenses | | \$14,003 48 | \$14,003 48 |
| Engineering and Miscel- laneous | | 78,843 02 | 78,843 02 |
| Construction | | 560,513 97 | 560,513 97 |
| | | <u>\$653,360 47</u> | <u>\$653,360 47</u> |
| Chapter 78 — Resolves of 1913 | <u>\$389 14</u> | | <u>\$389 14</u> |
| Chapter 84 — Resolves of 1913 | <u>\$636 58</u> | | <u>\$636 58</u> |
| Dorchester Tunnel Exten- sion | <u>\$520 19</u> | | <u>\$520 19</u> |
| Grand Totals | <u>\$54,996,287 40</u> | <u>\$3,461,681 27</u> | <u>\$58,457,968 67</u> |

The report of the Chief Engineer giving the work in detail follows.

THOMAS F. SULLIVAN,
NATHAN A. HELLER,
ARTHUR B. CORBETT,
Commissioners.

REPORT OF THE CHIEF ENGINEER.

BOSTON, December 31, 1930.

THOMAS F. SULLIVAN, NATHAN A. HELLER AND ARTHUR B. CORBETT, *Commissioners, City of Boston Transit Department.*

GENTLEMEN,— I herewith submit a report for the year ending December 31, 1930.

The engineering work of the department during the past year has been divided to a large extent between the Traffic Tunnel, Boston to East Boston, and the Boylston Street Subway Extension, Governor Square, although plans have been prepared and construction supervised on several other projects, as follows:

Newbury Substation, Boylston Street Subway.

Park Street Station, Column Changes.

Ventilation of repair shop. East Boston Tunnel Alterations.

New concrete walk, Shawmut Station, Dorchester Rapid Transit.

Ventilation shaft, Shawmut Station, Dorchester Rapid Transit.

Canopies for four high speed trolley stations, Dorchester Rapid Transit.

Adams Street Bridge, alterations and repairs, Dorchester Rapid Transit.

Fence enclosures, Parking area, Mattapan, Dorchester Rapid Transit.

New stop-on-signal station at Capen Street, Dorchester Rapid Transit.

Studies and estimates have been prepared for various proposed rapid transit routes. Inspection work has been carried on wherever construction of new buildings or alterations of old buildings adjacent to the city's subways has been in progress.

All field engineering and construction work has continued as in the previous year under the supervision of Assistant Chief Engineer Wilbur W. Davis, and the office work has continued under the supervision of Designing Engineer Leonard B. Howe.

TRAFFIC TUNNEL, BOSTON TO EAST BOSTON.

A general description of the Traffic Tunnel was given in the last annual report.

The triangulation survey across Boston Harbor, which was in progress at the close of the last year, was completed in January. The method used was as follows:

A triangulation point was established on the roof of the building of the Bay State Fishing Company at the northwesterly end of Sumner Street, East Boston, and a base line nearly two thousand feet long was run from this point through the middle of Sumner Street to a point opposite the building of the Boston Terminal Refrigerating Company, 239-243 Sumner Street. From the latter point a right angle to the base line was turned and a second triangulation point established on the roof of the Refrigerating Company building. The third triangulation point was located on a base line on the end of Lincoln Wharf on the Boston side of the water.

The base line in Sumner Street was measured twice on days which had a difference in temperature of about thirty degrees. The measurements were made on the surface with a pull of fifteen pounds, and corrections figured for differences in elevation. Temperature corrections were also made, the tape having been tested on a bar at the State House which standardized at 62° . The difference in the corrected measurements for the two days was but .027' and the average was taken for the true length of the line.

The transit was set up on the triangulation point on the Fishing Company building and the angle measured between the base line in Sumner Street and the line to the triangulation point on the Refrigerating Company building. This line being the hypotenuse of a right angled triangle, its length could be calculated, using the above angle and the length of the base line in Sumner Street. This gave the length between the two triangulation points in East Boston. The length of the other two sides of the triangle could be calculated when the angles were known.

The three angles for the triangulation across the harbor were turned January 15-17, 1930, when there was not much wind and the light was good. The method was as follows:

One observer turned each angle ten times and then turned the telescope over and turned the angle ten times again. The average for the two sets of readings was taken as his measurement of the angle; a second observer then did likewise. The average of the two observers was taken as the true measurement of the angle. The sum of the three angles checked exactly. Targets made for the purpose were used as sights.

Connection of the base line surveys in East Boston to the triangulation was made by running the base lines in Border,

Havre, Paris and Lewis Streets to an intersection with the triangulation base line in Sumner Street and measuring the intersection angles. On the Boston side a base line was run from the triangulation point through Lincoln Wharf and Battery Street to the base line in Hanover Street and the intersection angles at each end measured.

As a check on the triangulation, another triangulation was made using the same points in East Boston, but taking a point on the base line on Union Wharf instead of that on Lincoln Wharf for the third triangulation point. The method of turning the triangulation angles was the same as in the other triangulation and connection to the Boston Base lines was made by turning the angle between the base line on Union Wharf and the side of the triangle from the point on the wharf to the point on the Fishing Company building.

LOCATION OF TUNNEL.

Studies were continued on the various locations proposed for the tunnel.

A new alignment plan showing the tunnel located on a straight line was submitted by the department to His Honor, Mayor James M. Curley, and was approved by him on April 16, 1930.

Plate I shows the location of the tunnel.

A new plan and profile was, therefore, submitted to the Department of Public Works of the Commonwealth on April 17 and on May 6 a permit was granted. A similar plan and profile was submitted with an application for a permit to the War Department on April 17 and a permit was granted on May 8.

METHOD OF CONSTRUCTION.

Two methods of construction had been given consideration by the department; namely, the trench method and the shield method.

The trench method consists in dredging a deep trench in the harbor bottom, and then floating in precast tunnel sections approximately 200 feet in length, sinking these sections in place, connecting them and then backfilling the trench. The dredges, scows, barges, and other apparatus required for this work occupy considerable area and would tend to block up the main ship channel. At best, this method could only be used

on less than one-third of the length of the tunnel, the other two-thirds or land sections being built largely under buildings and streets would necessitate the use of the shield method. This latter method consists in driving the tunnel while the men work under the protection of a steel shield, using compressed air where necessary. The shield method does not disturb the land surface above and of course does not interfere with navigation when the shield is passing below the harbor bottom.

During the first of the conferences with the Army Engineers representing the War Department, in reference to the permit for the tunnel, it was apparent that there might be considerable opposition to the trench method from shipping interests and from the Navy Department, especially, as the Navy Yard lies upstream from the tunnel location.

Furthermore, the War Department had, within a few years, refused to grant a permit for the trench method to be used under East River, New York, and it was extremely doubtful if a permit for this method could be secured here. Finally, there was no apparent saving to be made by the trench method as it could only be used on so short a section of the work. The general contractor would be required to set up a separate plant on each side of the harbor to drive the shield portions, which would duplicate his plant expense and in consequence it was probable that unit prices for the shield portions would be much higher than if the contractor were allowed to drive one shield from one side to the other. The department, therefore, adopted the shield method and the contract plans are being prepared with this method of construction in view.

Additional borings along the line of the tunnel, as finally approved, were required and proposals for doing this work were advertised for and received. The contract was awarded on May 26, 1930, to B. F. Smith & Co., Inc. The contract called for land borings on both sides of the harbor and a number of water borings in the harbor. The borings were carried down well below the bottom of the proposed tunnel and indicated in nearly every case good material through which to construct the tunnel.

Surveys have been continued on both sides of the harbor along the line of the tunnel. Pipes and underground structures have been located as far as possible. All buildings along the line have been photographed and both exterior and interior measurements taken. Plans and descriptions of all of the real

estate to be taken in fee by eminent domain have been made and most of the property required, both in Boston and East Boston, has been taken. Where the tunnel is to pass at such depth beneath buildings and other structures that takings in fee are unnecessary, easements are to be taken. Plans and descriptions are now being prepared for taking these easements.

Proposals for removing or tearing down the first group of buildings in East Boston were received and the contract awarded to the New York Building Wrecking Co. on Nov. 28. This work is now nearly completed.

Other contracts for the removal of buildings will be awarded early next month.

For purposes of construction, the traffic tunnel will be divided into three sections, the shield driven or center section and the open cut or end sections. The shield driven section is by far the longest, being about seven-eighths of the entire length between portals. As this section will require about two years to construct, it will be the first to be let. Plans and specifications are now nearly completed for this section and it is planned to advertise it early in the coming year. The section will be known as Section A and is about 4,850 feet in length. The tunnel will be circular in cross section and will be 31 feet outside diameter.

The outer shell or lining is to be of welded steel, encasing a reinforced concrete tunnel ring of 18 inches in thickness.

The roadway will be 21' 6" wide between curbs, with additional clearance above the curbs. The height from roadway to ceiling is to be 13' 6".

The circular section lends itself well to a vehicular tunnel where artificial ventilation is required, as there are large spaces above the ceiling and below the roadway which may be used for air ducts, the space below being the fresh air duct and the space above the foul air duct.

The ceiling will be a 4" reinforced concrete slab, and the floor will be of steel beam and concrete construction. There will be two ventilation shafts and one construction shaft built in connection with construction of Section A. These shafts will be of reinforced concrete construction, the ventilation shafts being about 40' x 57' in area and the construction shaft being about 34' x 43' in area.

The finish work such as tiling, fences, paving, equipment, etc., will not be included in the present contract but will be

done when both the tunnel and the open-cut sections are completed. Plans and specifications for these latter sections have been started and it is planned to follow with the construction work as fast as the buildings are removed from the site. It is expected that these latter sections will be finished well ahead of the shield section.

The details of the ventilation buildings are dependent to a large extent on the type of fan equipment used. It is planned, therefore, to advertise for proposals for this equipment in advance of the final determination of the design of the ventilation buildings, with a view to effecting any saving in the construction of buildings that may result. The contract for the shield section will so be arranged that work can be started on these buildings long before the shield section is completed.

The ventilation building on the Boston side is to be located at 308 to 328 North Street. The East Boston ventilation building will be located at 55 to 65 Liverpool Street. Both buildings are directly over the tunnel; the shafts beneath them, noted above, are approximately 60 feet in depth.

The engineers' field office on the Boston side is at present at 116 North Street. The East Boston Field Office will be located at 123 Meridian Street, East Boston.

Assistant Engineer Robert B. Farwell is in charge of the work.

BOYLSTON STREET SUBWAY EXTENSION— GOVERNOR SQUARE.

The plan prepared by the department for the removal of the surface car tracks from Governor Square, provides for a four-track underground station beneath the location of the present Kenmore Station which is at the head of the open incline of the Boylston Street Subway at Kenmore Station. The plan provides for two new open inclines for trolley cars, one to be located in the reservation in Commonwealth Avenue and the other in Beacon Street, both beyond and to the west of Governor Square. The plan makes necessary extensive alterations in the present subway from a point near Muddy River directly under the Collins Monument to the top of the present open incline near Kenmore Station. The invert or bottom of the present subway will be removed and a new invert and side-walls will be built at greater depth. The work will necessarily have to be done while cars are being operated in the present subway and on the present incline, which will eventually be

removed. A loop at the easterly end of the station is provided for by means of a single track subway connecting with the two outer station tracks.

Governor Square is heavily congested with automobile traffic. Beneath the Square are two 48" water mains and also the Muddy River conduit about 8' x 11' in size; together with a network of other smaller pipes and conduits. The scheme of construction, therefore, provides that the work be carried on in a series of steps in order to relocate these important mains without interrupting their services and also to handle the automobile and electric car traffic during the different phases of the construction.

Plate II shows a general view of Governor Square previous to starting work.

Plans were made to conduct this work by using the department's labor force in a similar manner to that by which the East Boston Tunnel Alterations work in Maverick Square was handled. Upon the acceptance of the Act, steps were immediately taken to start the construction which it was estimated would take about 3 years to complete.

The assembling of a construction plant was started on July 14. A temporary yard was fenced off on the reservation in the center of Commonwealth Avenue just west of Muddy River and extending to Charlesgate West. A men's house and timekeepers' office was built in the southeast corner. This house also contained a foreman's room. On the opposite side of the yard, foundations were started for an air compressor plant, from which compressed air could be piped to all parts of the work for use in operating pneumatic concrete breakers, drills, air hammers for driving sheeting, for riveting, etc.

Proposals for the compressor plant were called for and included a compressor capable of delivering over 1,000 cubic feet of free air per minute, a 200 horsepower direct current electric motor, together with a large storage tank, a switchboard, and necessary wiring and piping. This plant was later furnished and erected by the Chicago Pneumatic Tool Company.

Plate III shows the compressor plant.

Just west of the compressor house, a carpenters' shop, tool house and gasoline tank were installed. On the south side of the yard, an electricians' house, oil house and toilet facilities were provided. Space for storage of lumber was also allowed.

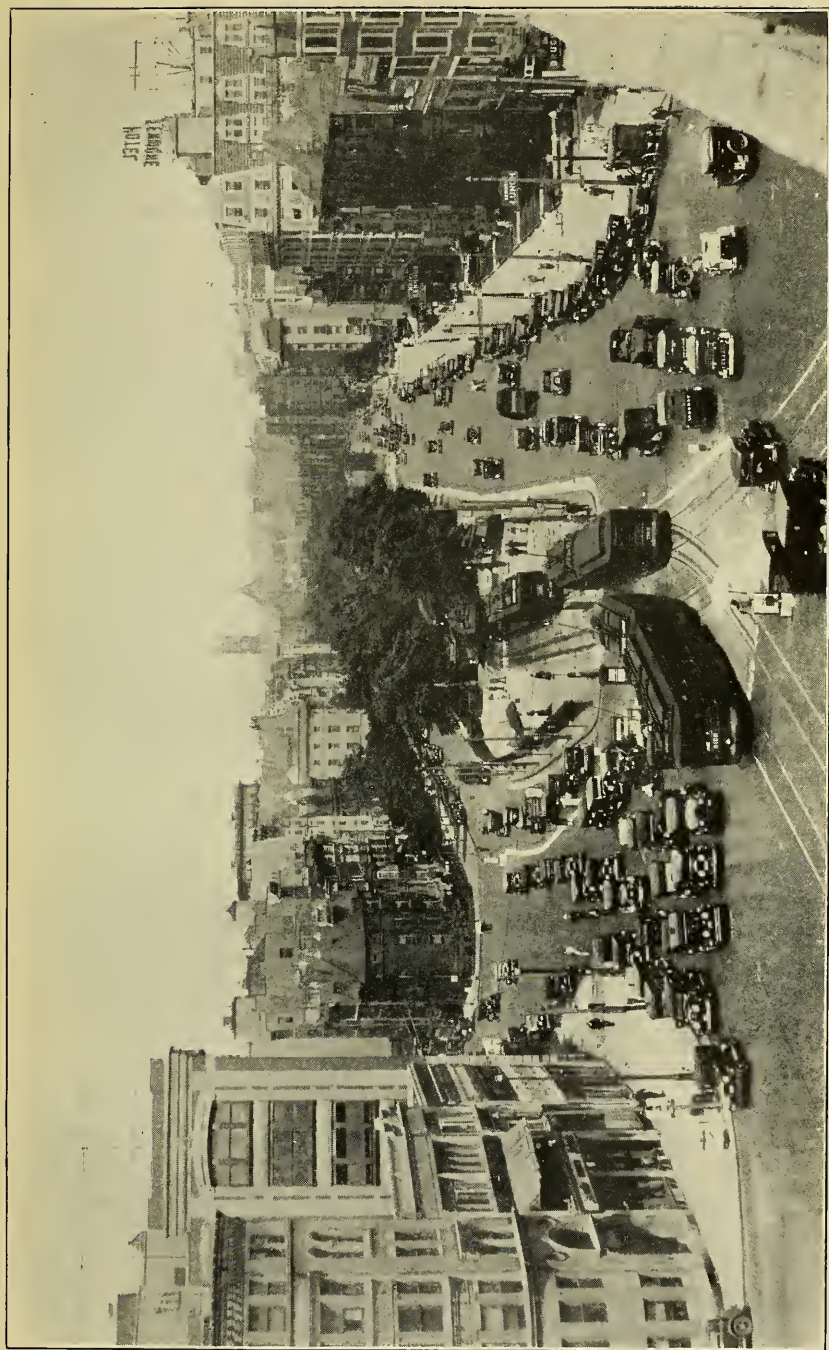


PLATE II.—GENERAL VIEW OF GOVERNOR SQUARE, TAKEN JUST PRIOR TO BEGINNING CONSTRUCTION OF
SUBWAY EXTENSION.

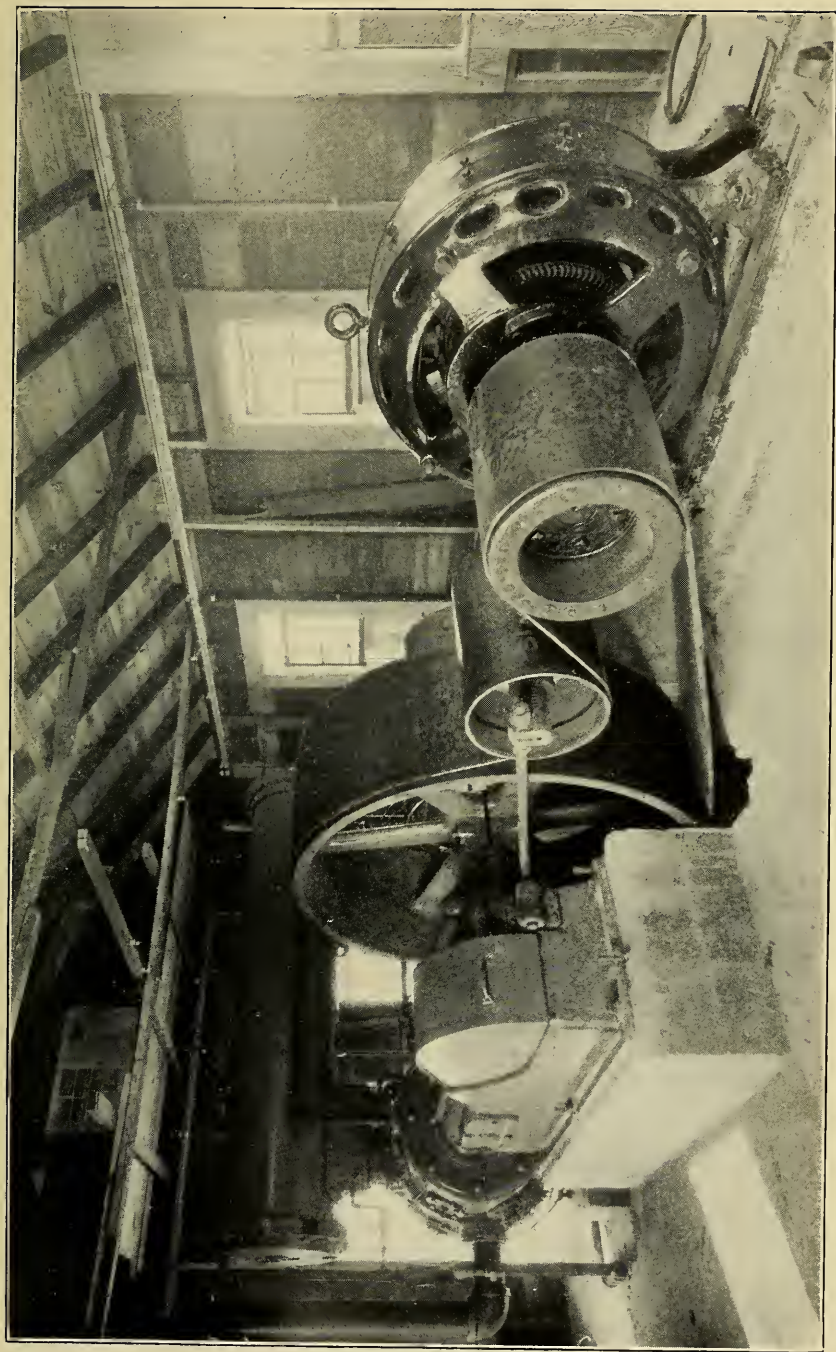


PLATE III.—AIR COMPRESSOR PLANT.

On the reservation beyond Charlesgate West, the erection of a field engineers' office was started. Two portable electric derricks, a portable compressor and other tools were brought over from the department's yard at Cypher Street, South Boston. The locations for the first two shafts were staked out and on July 21 the construction work was officially started by His Honor, Mayor James M. Curley.

Arrangements were made with the Massachusetts District Commission to dispose of surplus excavated material along the bank of the Charles River just east of the Cottage Farm Bridge. The trucking of this material was let by contract to M. McGinnis Co., after bids were received from 19 trucking firms.

A third shaft was started just in the rear of the Collins Monument. This was followed by others and by August, six electric derricks had been brought over from the yard and were in operation at different shafts. The labor force meanwhile had been gradually increased from a small number to over 200 men. By September the number was increased to 325 men, and on September 21, a night shift was started. The night shift went on at midnight and worked through until 8 A. M. It was employed at first on drilling and removing concrete. As fast as new openings were made, this night shift was increased in number, and on November 4, a third shift or evening shift was put on. Since then, the work has gone on without interruption, twenty-four hours a day.

In excavating the shafts, ground water was encountered about 12 feet below the level of the street, and as the shafts are put down to an average depth of 40 feet, a large amount of water has to be pumped. To take care of the discharge from the pumps, an 8" pipe line was laid in the reservation crossing under Charlesgate West and running easterly to Muddy River. A great number of pumps varying from small air pumps to 4" diaphragm pumps and 4" and 6" electric centrifugal pumps are kept constantly running to handle the water encountered.

As the second shaft neared bottom, considerable hydrogen sulphide gas was encountered. This at first caused discomfort, as it caused the men's eyes to water, but it was soon apparent that it would become unbearable, if not actually dangerous. The work at this shaft was immediately stopped and a chemical analysis was made to determine if other gases were also present, but none were found.

Arrangements were made to install large galvanized iron flues running from the surface down into the shaft and arranged so that branches could be run into the various drifts under the old subway as they were carried forward.

An electrically driven Sturtevant Fan was installed at the surface in a small building. This fan was connected with a large vertical pipe and was run as an exhauster, pulling the hydrogen sulphide gas from the bottom. The shaft being open at the top allowed the fresh air to flow down. This method worked satisfactorily and has kept the shaft well ventilated.

Plate IV shows one of the exhauster fans and flues for removing hydrogen sulphide gas from the shafts.

It was necessary later on to make a similar installation at the shaft in the rear of the Collins Monument where a large amount of hydrogen sulphide was encountered near the bottom of the shaft. Although a great many other shafts and deep trenches have since been excavated, thus far no more of this gas has been encountered.

The work to date has been divided into two distinct sections — the first being the portion under the old subway which is being underpinned and the second being under the old Kenmore Station which is being temporarily supported.

UNDERPINNING THE OLD SUBWAY.

The portion of the work lying between Muddy River and the subway incline just east of Kenmore Station is the section of the old subway which is being underpinned by the construction of a lower invert and also sidewalls beneath it, while cars are still operated on their present tracks in the subway.

The method used in this section of the work is to put down a series of shafts adjacent to the old subway but carried below to the level of the new subway invert. These shafts are from ten to twelve feet in width and from thirty to forty feet in length and are heavily sheeted and braced.

The shaft near the Collins Monument or at the easterly end of the work is located on the south side of the old subway to keep it out of the street as much as possible. There are two large shafts about 70 feet apart on the reservation just west of Charlesgate West. These shafts are located on the north side of the subway in order to keep clear of Commonwealth Avenue.



PLATE IV.—EXHAUSTER FAN AND FLUE FOR THE REMOVAL OF HYDROGEN SULPHIDE GAS FROM THE DRIFTS.

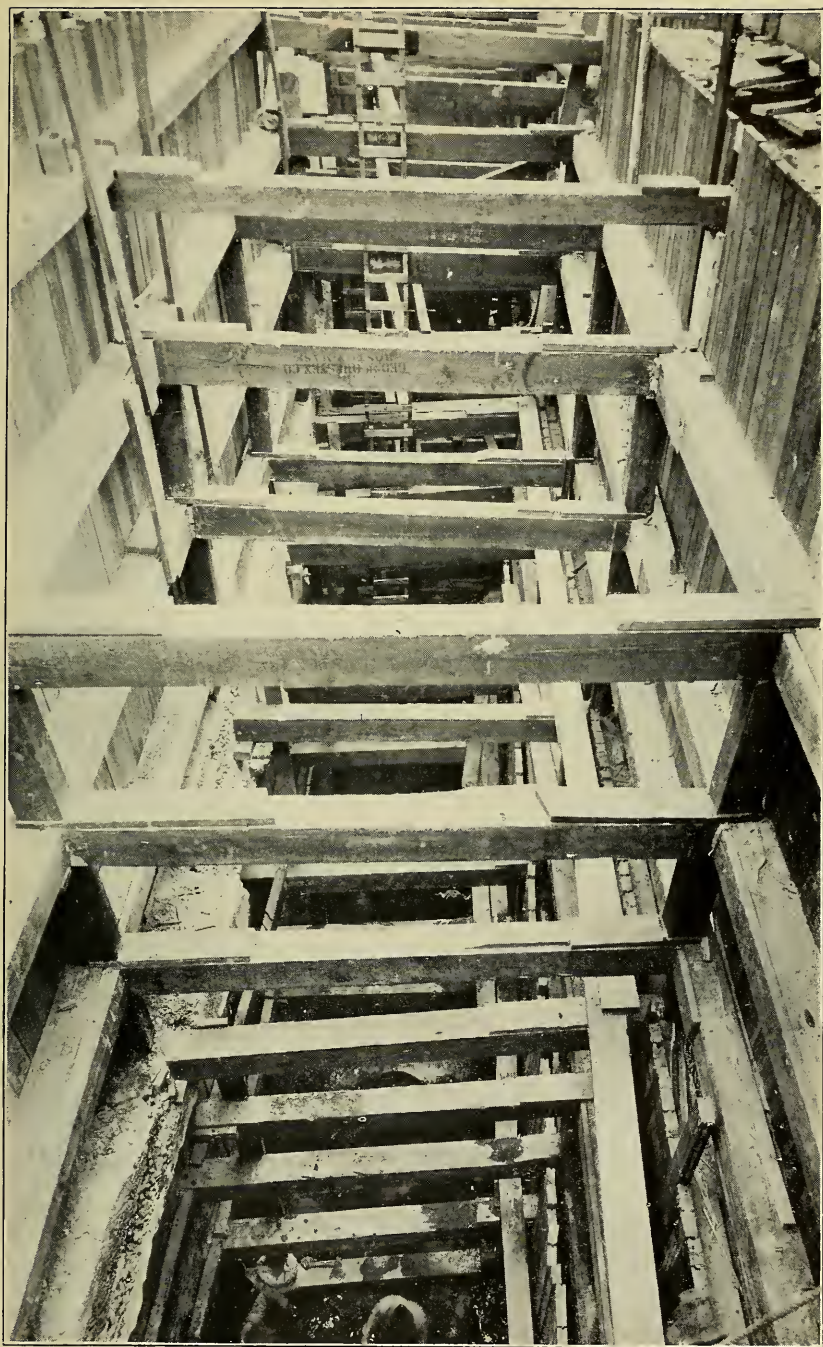


PLATE V.—VIEW LOOKING INTO ONE OF THE CONSTRUCTION
SHAFTS ADJACENT TO OLD SUBWAY.

Other shafts are put down on both sides of the incline which, being located in the center of the reservation, allows them to be built clear of the street.

Plate V is a view looking down into one of these shafts and shows the method of the sheeting and bracing used.

When the shafts reach bottom, drifts about 14 feet in width are driven under the old subway. The wooden piles are cut off as the drifts advance. The concrete mat of the old subway below the waterproofing is removed by drilling and blasting, and later, the reinforced concrete invert is removed in sections by the same means, the tracks above having been supported on steel beams. These beams are 8" H beams from 14 to 18 feet in length and were put in to act as stringers under the ties after the ballast had been removed. This latter work was done at night time by the Elevated Railway trackmen after the cars had stopped running, the department having previously arranged with the Boston Elevated Railway to substitute a bus service from Kenmore Station to Park Street, between the hours of 1.30 and 5 A. M. This arrangement also made it possible for the department to drill and blast in the removal of the old reinforced concrete invert without interruption of cars and also possible danger to the passengers.

As soon as a section of invert approximately 14 feet wide and 30 feet long across the subway invert was removed, the new mats and backwalls were put in and waterproofed. The new reinforced concrete invert, sidewalls and center wall were then built and the old walls pinned down on to them. Spaces were left for two sets of steel cross beams which were brought up under the steel stringers previously referred to, and as soon as the track load was carried on these beams, work was started on the adjoining sections of the old subway on both sides. This slice method is being followed with considerable care and no settlement of the old subway is apparent on the portions thus far completed. No additional shafts can be put down without blocking the traffic in Commonwealth Avenue so that drifts are now being run longitudinally under the old subway where the slices are not located opposite the shafts. The longest portion that is to be done in this manner is from the Collins Monument westerly under the intersection of Charlesgate West and Commonwealth Avenue, a distance of 104 feet between shafts.

Plate VI is a view taken in one of the drifts under the old subway where some of the piles have been cut off, ready for the new lower invert.

The sidewalls and invert of the open incline are being underpinned in a similar manner to the subway proper, and it will be necessary later on to remove the portions of the walls of the incline which are above ground, as it is intended to fill it in with earth after the cars are running in the new subway below.

TEMPORARY BRIDGING AND SUPPORTING — KENMORE STATION.

The method being used to temporarily support the tracks and platforms for the present surface car station at Kenmore while the new Subway Station is being built below was studied in connection with the design and layout of the columns and roof beams of the new station. There are to be three lines of steel columns running longitudinally through the new subway station, these columns being spaced 12 feet on centers for the side platform columns and 6 feet on centers for the center line columns. The roof beams will be 6 feet on centers. A system of wooden trusses running crosswise beneath the tracks was laid out 12 feet on centers and so arranged that they would come in the spaces between the steel roof beams below. These wooden trusses were made of 10 x 12 yellow pine timber and heavily braced laterally and longitudinally. They supported 10'' x 14'' yellow pine stringers which carried the railway tracks above. Additional supports were placed for the side platforms. The platforms were made up in sections about 4' x 11' in area, of 3'' tongued and grooved sheeting. This method of construction also permitted longitudinal trenches to be carried down for the foundations of the steel columns upon which longitudinal steel girders could be placed, after which the steel roof beams could be erected, the reinforced concrete roof poured, waterproofed and the protection coat put on. The load of the trusses previously held on blocking, resting on the earth cores between the longitudinal trenches, could then be transferred onto the new roof and the blocking removed.

This work was started by first raising the tracks in Kenmore Station to a height of a little over two feet at the highest point. The Elevated Railway trackmen raised the tracks gradually by filling and tamping in a little each night as time permitted until the proper elevation was reached, after which the wooden stringers and platforms above referred to were placed. Exca-

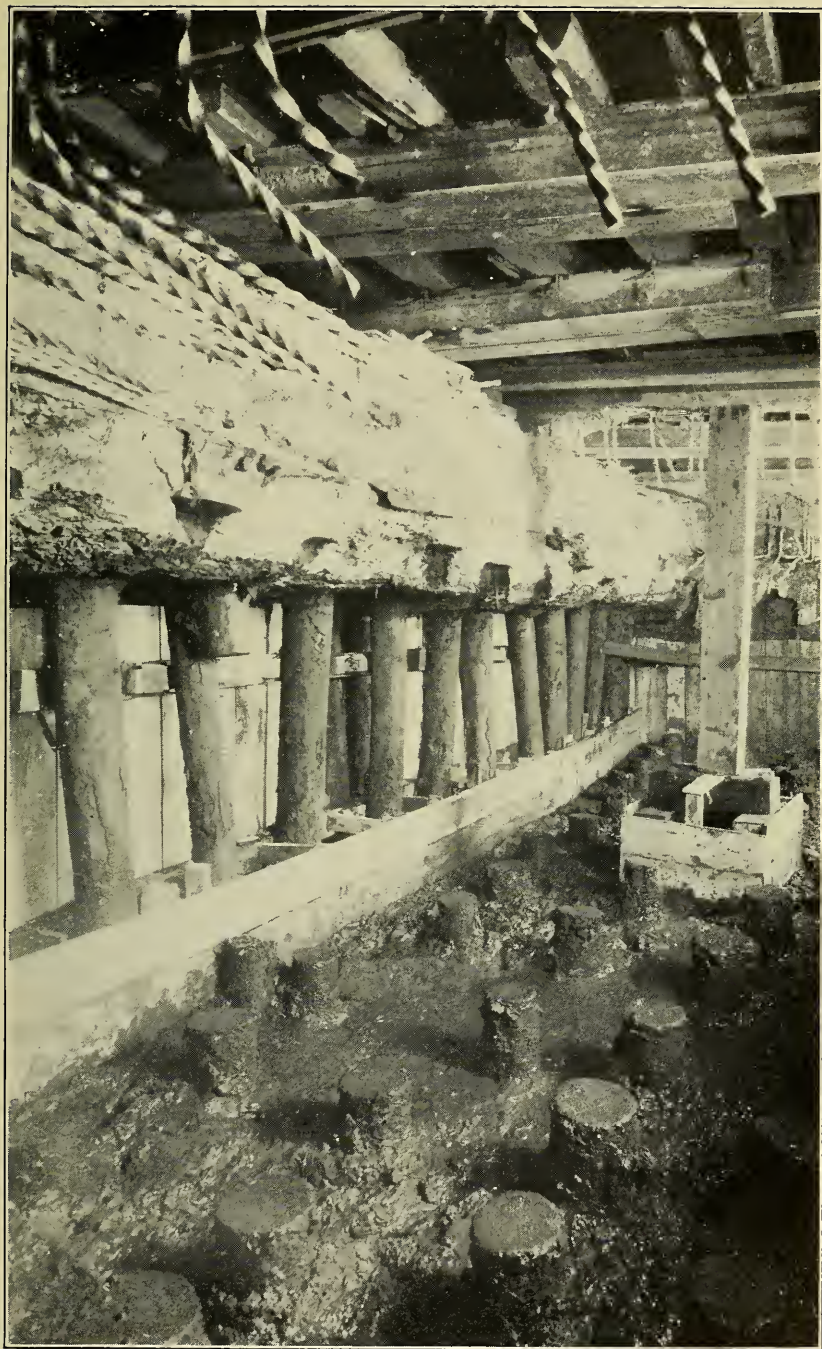


PLATE VI.—VIEW IN ONE OF THE DRIFTS UNDER THE OLD SUBWAY.

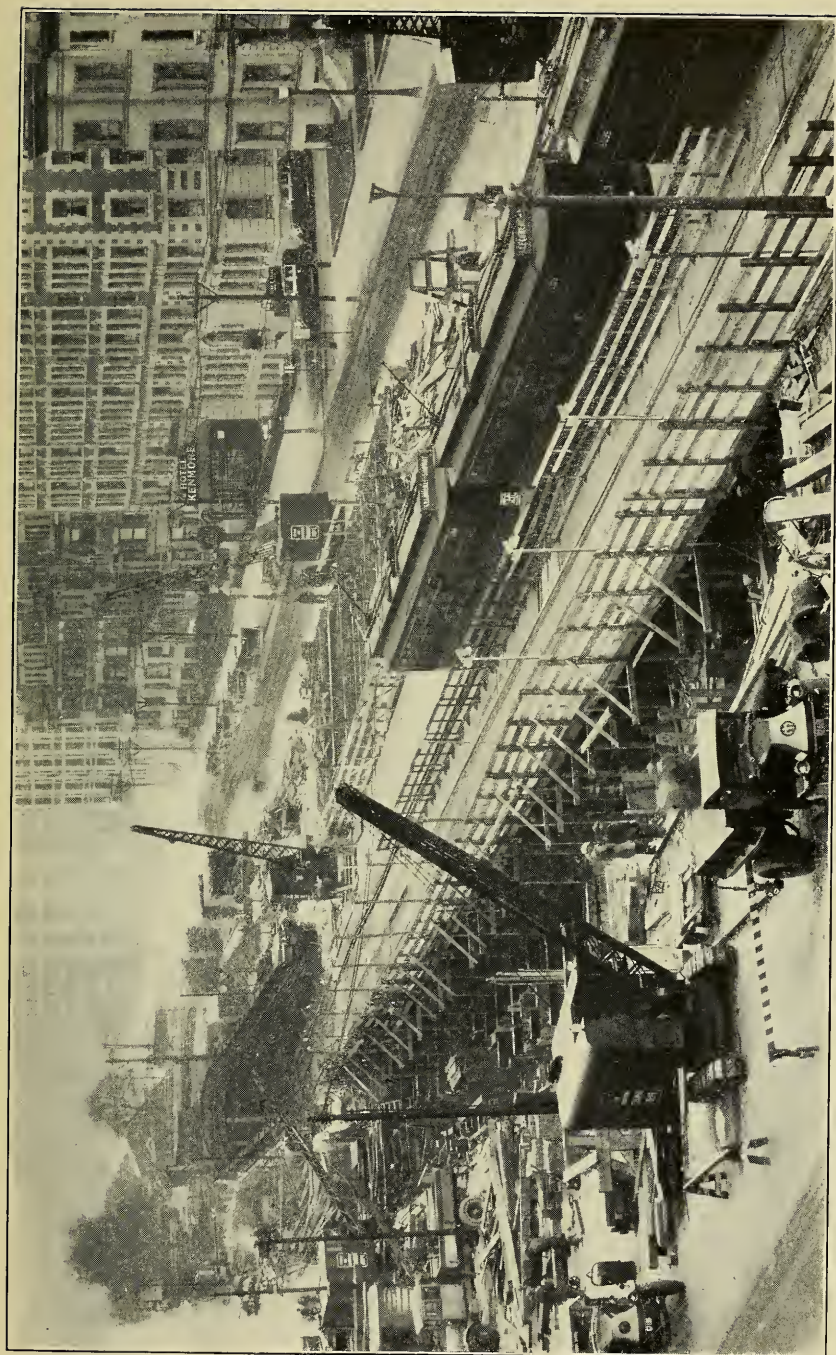


PLATE VII.—GENERAL VIEW OF KENMORE STATION TEMPORARILY SUPPORTED TO PERMIT CONSTRUCTION OF SUBWAY STATION BENEATH.

vation was then carried down by the night shift, posting down at different depths until it was possible to place the wooden trusses. As the excavation progressed in the different shafts, it became possible, also, for the day and the evening shifts to work under the bridging, the night shift then doing only that work which could not be done while cars were running.

The bridging and supporting work for the station has been completed and about one-third of the new subway roof built. Below the roof and between the column trenches are cores of earth which will later be taken out after which the concrete invert will be built. In addition to the column foundations, a large portion of the station sidewalls have been built by the trench method. The northerly wall has been carried as far to the west as is possible until the 40 and the 48-inch water mains are located. The southerly wall is about one-fourth complete.

Plate VII is a view at Kenmore Station showing temporary supports, platforms, etc., while construction is being carried on beneath.

The old brick sewer opposite Kenmore Street, crossing Commonwealth Avenue to Beacon Street has been replaced temporarily by a tight steel pipe sewer which will later be removed after a new concrete sewer is built across the roof of the new station.

RELOCATION OF WATER MAINS.

The present cast-iron water mains in Governor Square must be relocated to permit the building of the subway station and they will be replaced by two new welded steel water pipes, each 48" in diameter and $\frac{3}{4}$ " in thickness. One line will come down Beacon Street from the west, crossing Commonwealth Avenue and running under the northerly sidewalk, again crossing Beacon Street and connecting with the old cast-iron water pipe on Beacon Street. The other pipe will connect into the present pipe at Brookline Avenue near Governor Square and will run under Commonwealth Avenue South to a point about 100 feet west of Kenmore Street, where it will cross diagonally over the roof of the new subway station and then run down Commonwealth Avenue North to a point just east of the proposed subway car loop at which point it will connect with the old cast iron water pipe. When these new pipe lines are completed the new station and subway work can be carried farther to the west under Governor Square.

The contract for furnishing and delivering the new steel pipe was awarded to the Walsh Holyoke Steam Boiler Works and the pipe is now being made.

Additional equipment has been added to the plant as fast as it has been possible to open up new sections. Six gasoline derricks of the crawler type equipped with booms and also shovel arms have been added to the equipment. Two new gasoline-heated tar kettles of the latest type are used in connection with asphalt fabric waterproofing work.

The force has been increased to a total of 570 men and additional men will be added as fast as the work continues to expand.

The number of men on each shift is as follows: day shift — 330; evening shift — 110; and night shift — 130. Assistant Engineer William W. Lewis is in charge of the day shift; Assistant Engineer Harry T. Carroll, the evening shift; and Assistant Engineer Frederick C. H. Eichorn, the night shift. John J. Fallon, Jr., is general superintendent of the work.

A new plan has been prepared to extend the Beacon Street Subway portion of this work out to a point beyond Audubon Circle with an open incline coming up to the surface at St. Mary's Street. This plan now awaits the approval of the Department of Public Utilities and upon its acceptance preparations will be made to proceed with the additional construction in connection with the present Governor Square work.

DORCHESTER RAPID TRANSIT.

SHAWMUT STATION.

The ventilation shaft at Shawmut Station which was described in the last annual report and which was in progress of construction at the close of the year was completed by the Brophy Construction Company during the month of January.

Tests were conducted by engineers of the department to determine the results obtained in eliminating the annoying air currents in the Shawmut Station as a result of the construction of the new ventilation shaft. The tests showed that the practical results were very close to the theoretical as determined from the model and investigations made in advance; namely, that this shaft would reduce the velocity of these currents about 50% and that if further reduction was desired another shaft to the north should be built.

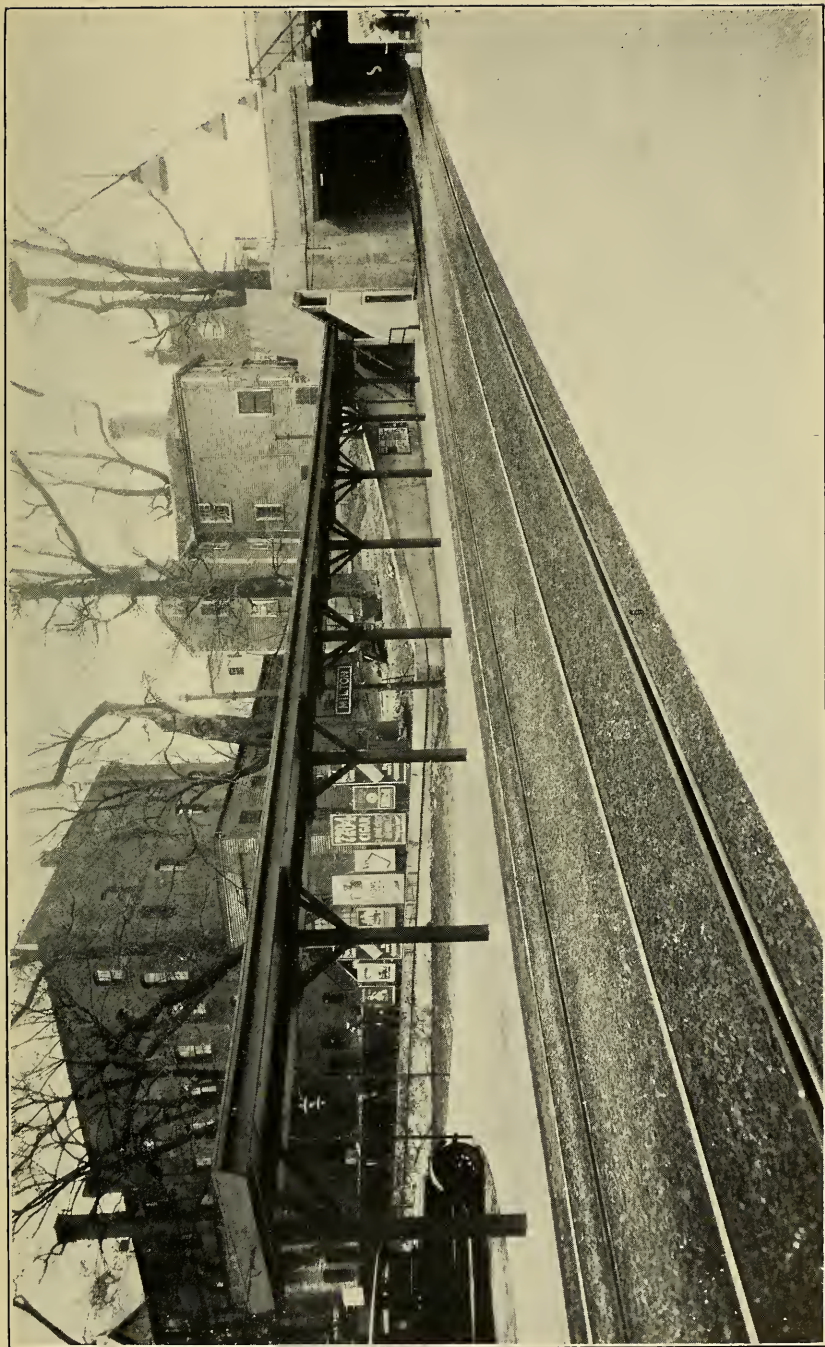


PLATE VIII.—NEW PLATFORM CANOPY, MILTON STATION.

During the year a new walk with iron pipe rail fence was built across the roof of the subway platform just south of the headhouse of Shawmut Station. This was built at the request of the Boston Elevated Railway to give easy access to Sharp Street, which street has been recently accepted and resurfaced.

ADAMS STREET BRIDGE REPAIRS.

The old Adams Street Bridge over the right of way of the high speed trolley tracks near Cedar Grove required strengthening and resurfacing. Plans and estimates were made for rebuilding the entire bridge, locating the abutments further apart to give clearance sufficient for third-rail trains, should the third-rail system be later extended beyond Ashmont. Owing to the cost of rebuilding the entire bridge, it was decided to postpone the relocation of the abutments until the extension was definitely decided upon, and in the meanwhile, to repair the floor of the old bridge.

The old bridge has a wooden floor supported by steel beams and girders. The old wooden floor which is badly rotted is being removed and the steel work repaired where necessary and scraped and painted by the department's ironworkers. New wooden floor beams and planking will be put on. The surface planking will be asphalt planking, $1\frac{1}{2}$ " thick. One-half of the bridge is being done at a time, thereby keeping the bridge open for traffic. This work is under the charge of Assistant Engineer Joseph P. Dever.

CANOPIES FOR HIGH SPEED TROLLEY CAR STATIONS.

At the request of the Boston Elevated Railway, plans and specifications were prepared and proposals asked for the construction of canopies over the inbound station platforms of the Cedar Grove, Milton, Central Avenue and Valley Road Stations of the high speed trolley line of the Dorchester Rapid Transit. These canopies are each about 100 feet in length and are built with steel posts and girders and have a wooden roof covered with a tar and gravel roofing and are drained by copper downspouts. The contract was awarded to the John Bowen Company in September and the work was completed on November 20.

Plate VIII shows the new canopy at Milton Station.

A section of concrete curb and wire fence about 300 feet in length, running along the northerly side of Eliot Street, Milton,

near the Adams Street Bridge was constructed during the month of October. This replaced the temporary wooden fence which had been built to allow the backfill in the deep cut at this point to settle.

The concrete curb was built by A. G. Tomasello & Sons, Inc. The woven wire fence was installed by P. J. Dinn & Company.

At Mattapan Station an addition of about 400 feet of 6' woven wire fence on the easterly side of the parking area was constructed by P. J. Dinn & Company and an alteration to the curb and wire fence near the busway was made by the Banspar Construction Company.

CAPEN STREET STOP-ON-SIGNAL STATION.

The residents near Capen Street, Milton, requested the Elevated Railway for a station at the location where the high speed trolley line crosses Capen Street in Milton. The nearest station to this district was the Mattapan Terminal, but as there was no bridge available for pedestrians across the Neponset River at this point, it was difficult to reach. The station at Valley Road was also some distance away. The Elevated Railway, therefore, agreed to ask the department to construct a stop-on-signal station at Capen Street. The station was constructed by building two gravel side platforms about 12' wide and 100' long. The gravel was topped with an asphalt binder — giving a firm surface. The station is well lighted at night by a series of lights strung lengthwise over the centers of the platforms.

The construction work was done by the Banspar Construction Company and completed in September.

Plate IX shows the Capen Street stop-on-signal station.

EAST BOSTON TUNNEL ALTERATIONS.

Additional ventilation facilities were required for the repair shops under Chelsea Street, East Boston. The shaft built on the sidewalk near Emmons Street contained an elevator well and an air shaft, and to this air shaft a galvanized metal duct was led from the shop. A small Sturtevant blower driven by an electric motor was installed in the shop and when put in operation greatly improved conditions. The metal work was installed by the department's men, the blower being installed by the manufacturer.

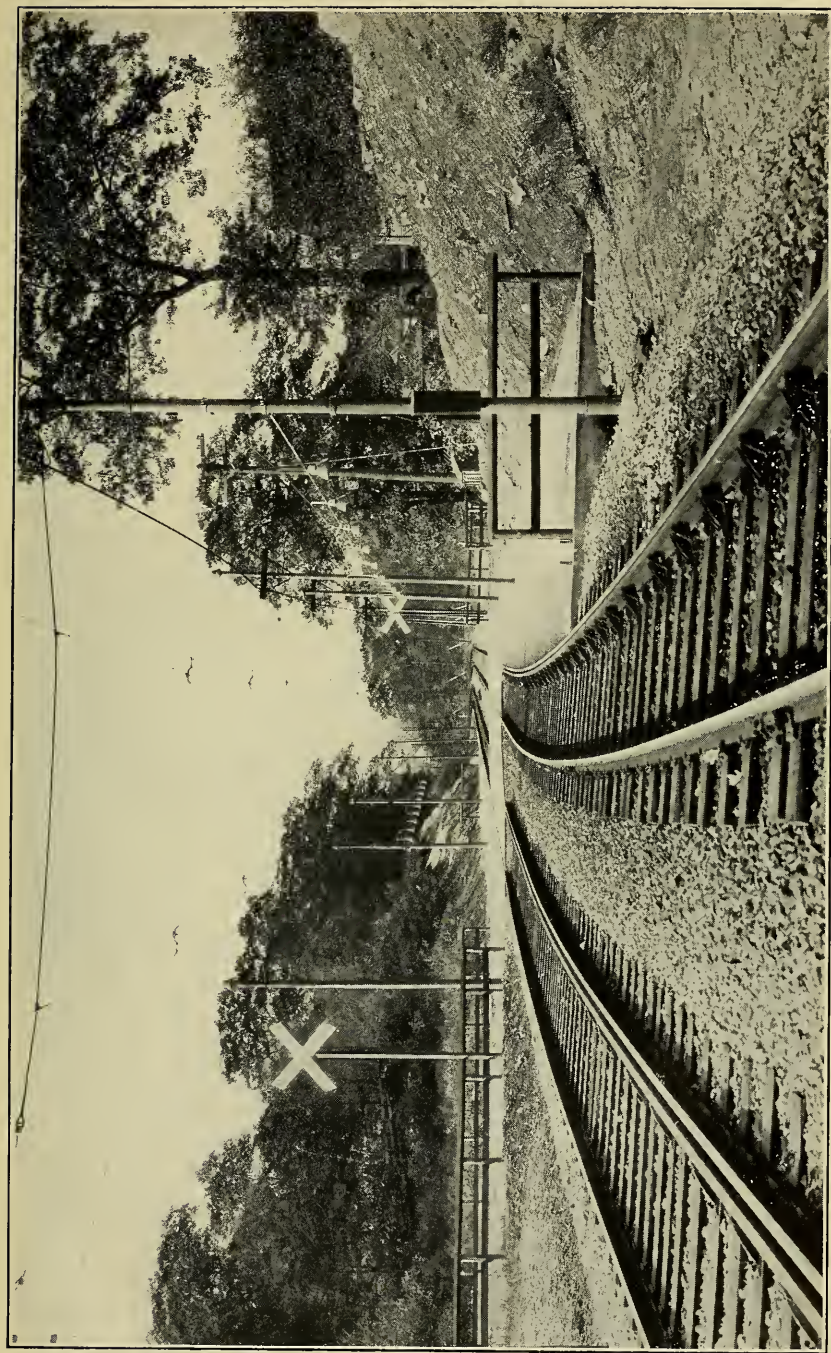


PLATE IX.—CAPEN STREET STOP-ON-SIGNAL STATION.

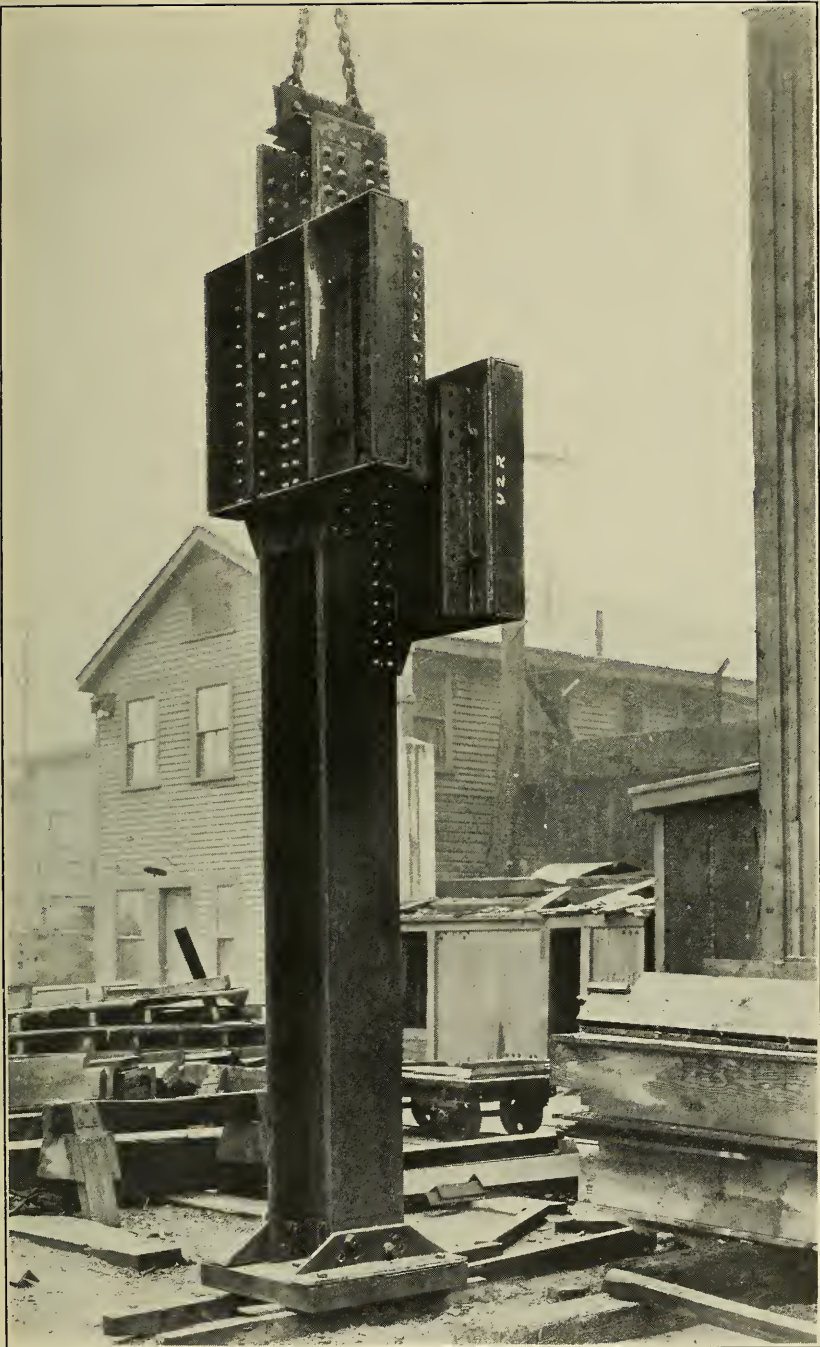


PLATE X.—TYPICAL COLUMN DESIGNED FOR HEAVY EC-
CENTRIC LOADING AT PARK STREET STATION.

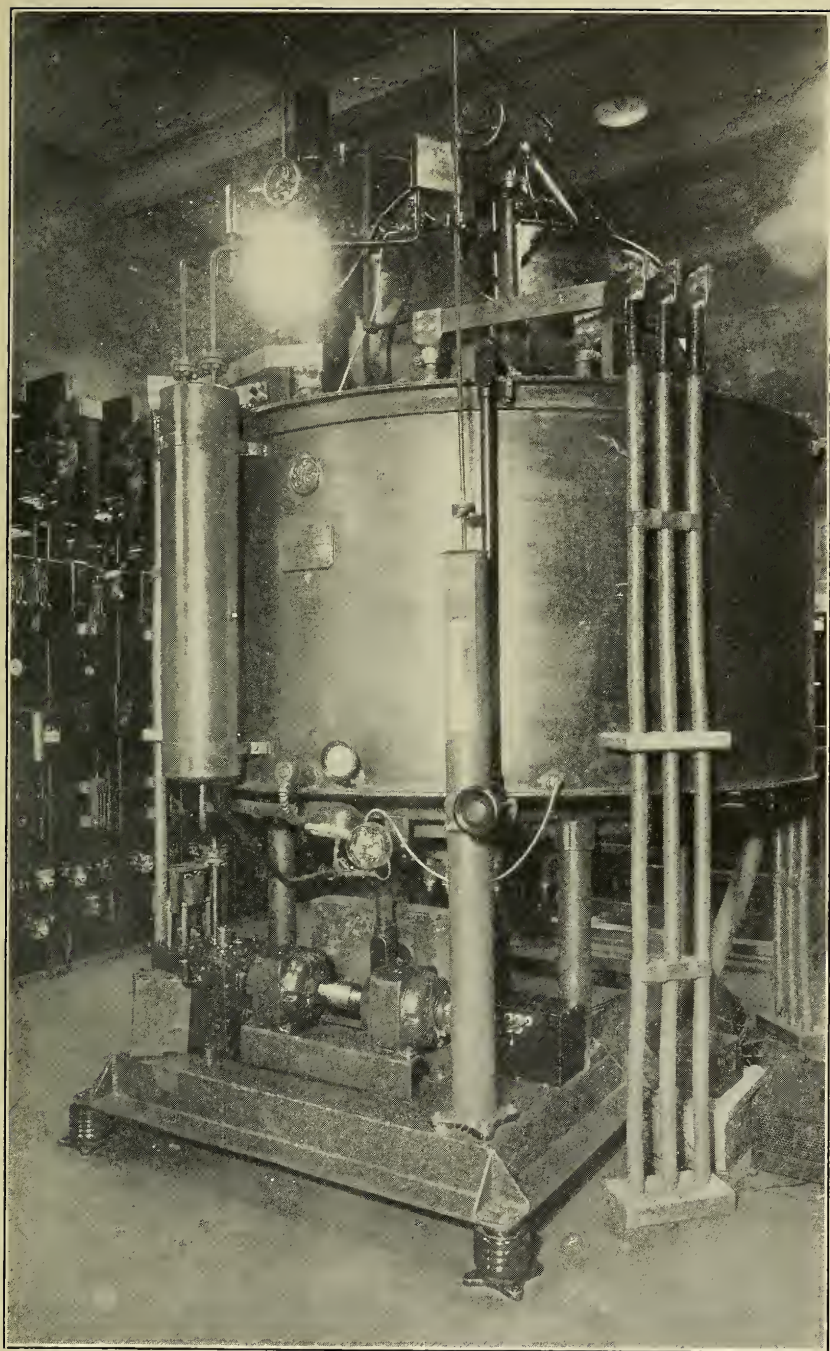


PLATE XI.—INTERIOR OF NEWBURY SUBSTATION SHOWING
MERCURY-ARC RECTIFIER.

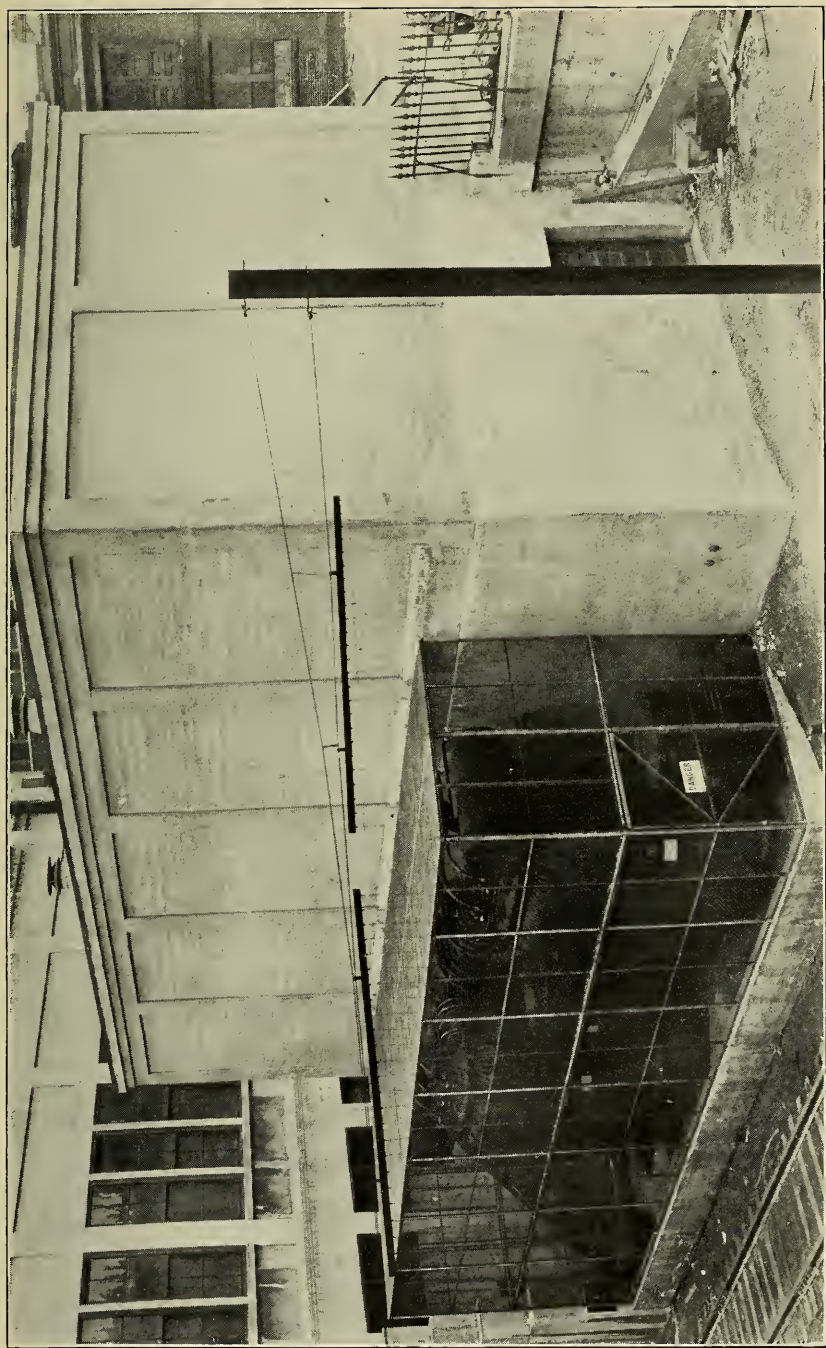


PLATE XII.—NEWBURY SUBSTATION.

PARK STREET STATION COLUMN CHANGES.

Work of changing over and relocating certain of the columns in the old Park Street Station, which was in progress at the close of the year, was continued during the early months of the year, and the work was completed in March. The work was such that it could only be carried on nights, most of it after midnight. It was done by the department's ironworkers and mechanics and successfully completed without any settlement to the roof or walk above. The new columns were of special design, required to take eccentric loads in most cases. The columns were fabricated at the department's steel shop, South Boston.

Plate X shows one of the Park Street Columns with brackets required for the heavy eccentric loads.

NEWBURY SUB-STATION, BOYLSTON STREET SUBWAY.

Plans and specifications were prepared by the department for a new sub-power station to be built in the rear of the Massachusetts Surface Station and located partly over the roof of the Massachusetts Subway Station. The building is 26 x 56 feet in area, two stories high and is constructed of reinforced concrete and steel. It has a transformer platform for outdoor oil cooled transformers on the south side adjacent to the Boston & Albany R. R. tracks. The building is to house two 3,000 Kilowatt Mercury-Arc Rectifiers and is the largest automatically operated and controlled sub-station of this type in New England.

A contract was let to J. A. Singarella and work started in April.

Concrete footings were provided by sinking caissons to proper bearing about 12 feet below the surface. These caisson footings were 3 feet in diameter, with footing flaring out to a diameter of from 5' to 8'.

The contract was completed on July 10, 1930 and equipment is now being installed by the Power Department of the Elevated Railway.

Plate XI is an interior view showing one of the Mercury Arc Rectifiers.

Plate XII is a view of the completed sub-station.

CYPER STREET YARD.

The increased amount of construction work by the department has necessitated increasing the yard force during the year in order to handle the large amount of steel, asphalt, waterproofing materials, reinforcing rods, equipment, tools and other materials required in the work. The number of men in the steel shop was temporarily increased to keep us with additional demand for fabricated steel. The yard and shops as in the preceding year, have been under the supervision of Assistant Engineer Samuel C. Lyman.

TESTING MATERIALS.

The inspection of all construction work has been done by the department's inspectors. In addition to field inspection, mill and laboratory tests of materials have been made as in the previous year.

Physical tests of concrete cylinders have been made by Skinner, Sherman, Esseler, Inc., which firm also made chemical analyses of foul air encountered on construction work to determine the amount of hydrogen sulphide and other gases.

Reinforcing rods, structural steel and welded steel water pipe have been inspected by William R. Conard.

Physical tests of all lots of cement received have been made by Mr. Charles N. Ryan, Cement Tester, Public Works Department.

Chemical and physical tests of waterproofing and asphalt have been made by Mr. Hiram Y. Waterhouse, Chemist, Public Works Department.

ENGINEERING FORCE.

The names of those members employed for more than one month are given in Appendix C.

Respectfully submitted,

ERNEST R. SPRINGER.
Chief Engineer.

APPENDIX A.

[CHAP. 394, ACTS OF 1930.]

AN ACT PROVIDING FOR THE ELIMINATION OF THE CROSSING AT GRADE AT GOVERNOR SQUARE IN THE CITY OF BOSTON BY STREET RAILWAY CARS USING THE BOYLSTON STREET SUBWAY.

Be it enacted, etc., as follows:

SECTION 1. Chapter three hundred and forty-one of the acts of nineteen hundred and twenty-five is hereby amended by striking out section two and inserting in place thereof the following:—*Section 2.* The transit department of the city of Boston may make such alteration in and extensions to the Boylston street subway as it may deem necessary for the purpose of eliminating the crossing at grade of Governor square by cars using said subway, for the improvement of street car service on Commonwealth avenue and Beacon street, for the purpose of providing means for a convenient interchange of passengers between cars or trains operated in said subway and those operated on surface lines connecting therewith and for improving the transportation facilities furnished in said subway, and to that end shall have the powers conferred upon the Boston transit commission by chapter seven hundred and forty-one of the acts of nineteen hundred and eleven and amendments thereof. Said alterations and extension shall be so designed and constructed that cars from both Beacon street and Commonwealth avenue can be operated through said Boylston street subway. To meet the cost of such alterations and extensions, the city of Boston may issue bonds (hereinafter called subway bonds) to an amount not exceeding three million one hundred thousand dollars increased by such amount, if any, as may be agreed upon by said transit department and the Boston Elevated Company, hereinafter called the company, in the event that alterations in the plan originally approved are agreed upon and approved as hereinafter provided, in the same manner as bonds issued, to meet the original cost of the Boylston street subway, and all rentals or other payments received by said city under this act shall be so far as necessary for the payment of interest on said bonds and the balance shall be used for the payment of the principal thereof.

To meet any additional cost of such alterations and extensions over and above the amount of subway bonds hereinbefore authorized to be issued, the treasurer of the city of Boston, without any other authority than that contained in this act, shall from time to time on request of the transit department issue and sell at public or private sale bonds of the city to an amount sufficient to provide funds for the payment of such additional cost, which bonds shall be outside the statutory limit of indebtedness. Each authorized issue of bonds shall constitute a separate loan. The bonds shall be designated on their face, Governor Square Improvement Bonds, Act of 1930; shall be in such form of coupon bonds or registered bonds without coupons or coupon bonds exchangeable for registered bonds as the treasurer

of the city shall determine; shall be for such terms not exceeding fifty years from the dates of issue as the mayor and treasurer of the city shall determine; shall bear interest in accordance with the provisions of chapter fifty-two of the Special Acts of nineteen hundred and eighteen, and shall be payable by such annual payment as will extinguish the same at maturity and so that the first of said annual payments on account of any loan shall be made not later than one year after the date of the bonds issued therefor and that the amount of said payments in any year on account of such loan shall not be less than the amount of the principal of the loan payable in any subsequent year. The said annual amounts, together with the interest on the loan, shall without further action be assessed until the debt is extinguished.

No such work shall be done, however, unless and until a plan therefor shall be approved by the department of public utilities, and unless and until a contract between the city of Boston and the company shall have been executed for the sole and exclusive use by the company of such alterations and extensions for a term ending upon the termination of the lease of said subway. Any plan so approved may be altered at any time by a new plan approved in like manner except that after the execution of said contract for use no such alteration shall be made without the consent thereto of the company in writing. The contract shall be in the same general form as those authorized by said chapter seven hundred and forty-one, except insofar as any other provisions may be agreed upon by said transit department and the company as specially applicable to the demised premises. The net cost of such alterations and extensions shall be determined in the manner provided in said chapter seven hundred and forty-one but for the purposes of determining the rental shall not be deemed to exceed three million one hundred thousand dollars, increased by any sum which may be agreed upon by said transit department and the company in the event that alterations of the plan originally approved are later agreed upon by them and approved as aforesaid. The rental shall be payable annually on the twenty-fifth day of July in each year. Any alteration or extension made under this act shall be deemed a part of the Boylston street subway. Such contract for use shall provide that the company shall pay to the city of Boston for each full year ending with the last day of June, and ratably for any portion of a year, an annual rental, which shall be sufficient to provide an amount equal to one half of one per cent of the net cost of such alterations and extensions in addition to the annual amount of interest on the subway bonds issued to pay for said net cost, but not less than four and one half per cent of said net cost in any event; provided, however, that said annual rental shall be payable by the company in any year only if and to the extent that the reserve fund provided for by section five of chapter one hundred and fifty-nine of the Special Acts of nineteen hundred and eighteen exceeds on the last day of June the amount originally established, such excess to be determined and obligation to pay such rental to accrue in priority to any reimbursement of the commonwealth under sections eleven and thirteen of said chapter one hundred and fifty-nine. If by virtue of the foregoing proviso the company does not make the full rental payments as above provided, the commonwealth shall, during the term of said contract and until the subway bond issued by the city of Boston under this section shall have

been paid, or a sinking fund accumulated sufficient to pay the same at maturity, pay to the city of Boston on or before August first in each year one half of any amounts so unpaid, and the city of Boston shall place the other half in its next ensuing tax levy.

On application of the city of Boston, the department of public utilities shall determine the amount so to be paid by the commonwealth. In order to provide for any such payment, the state treasurer may borrow as provided in section eleven of said chapter one hundred and fifty-nine. In case the commonwealth shall be called upon to make any payments hereunder, the amount thereof, with interest or other charges incurred in borrowing money for the purpose, shall be assessed upon the cities and towns which paid assessments under the last preceding assessment under section fourteen of said chapter one hundred and fifty-nine in proportion to the amounts paid, and shall be assessed and collected in the manner provided in said section fourteen.

SECTION 2. Said chapter three hundred and forty-one is hereby further amended by striking out section three and inserting in place thereof the following:— *Section 3.* If, as of the last day of June in any year during the period of public operation of the company under the provisions of said chapter one hundred and fifty-nine, the reserve fund provided for in said chapter shall, after deducting the amount of the annual rental herein provided for, exceed the amount originally established, the trustees of the Boston Elevated Railway Company shall apply the excess, so far as necessary, to reimburse the commonwealth for all amounts paid by the commonwealth to the city of Boston under the provisions of section two of this act, and in priority to any reimbursement of the commonwealth under sections eleven and thirteen of said chapter one hundred and fifty-nine.

SECTION 3. Said chapter three hundred and forty-one is hereby further amended by adding at the end thereof the three following new sections:— *Section 4.* Upon and after the termination of public operation of the company under said chapter one hundred and fifty-nine the reserve fund established under the provisions of section five of said chapter shall, except as provided in section thirteen of said chapter and in this act, be used only for the purpose of making good any deficiency in income if the same is insufficient to meet the cost of the service as defined in said chapter, and whenever, on the other hand, such income is more than sufficient to meet the said cost of the service, the excess shall be transferred to and become a part of the reserve fund.

Section 5. Upon and after such termination of public operation, the company shall, on or before the thirty-first day of July in each year, report to the state treasurer the amount, if any, by which said reserve fund on the preceding thirtieth day of June, after deducting the amount of the annual rental herein provided for, exceeded the amount originally established, and the company shall thereupon pay over such excess insofar as necessary to reimburse the commonwealth for all amounts paid after such termination of public operation, by the commonwealth to the city of Boston under the provisions of section two of this act. If the state treasurer or the attorney general is not satisfied as to the correctness of said report, either may, at any time within sixty days after its receipt, petition the department of public utilities for a determination of such excess and said depart-

ment shall determine the same. If the amount of such excess, so determined, is greater than the amount originally reported, the balance shall be paid by the company to the commonwealth within twenty days from the date of such determination.

Section 6. Any amounts reimbursed to the commonwealth under the provisions of this act shall be distributed among the cities and towns assessed under this act in proportion to the amounts so assessed.

SECTION 4. This act shall take effect upon its acceptance both by vote of the city council of the city of Boston, approved by the mayor, and by the Boston Elevated Railway Company by vote of its board of directors, and upon the filing of certificates of such acceptances with the state secretary; provided, that such acceptances, approval and filing occur during the current year. For the purpose of such acceptances, this act shall take effect upon its passage.

Approved May 28, 1930.

APPENDIX B.

CONTRACT FOR USE OF ALTERATIONS IN AND EXTENSIONS TO THE
BOYLSTON STREET SUBWAY.

I.— This contract made this thirtieth day of June in the year one thousand nine hundred and thirty by and between the city of Boston, hereinafter called the city, acting by the Transit Department of the City of Boston, hereinafter called the department, under and by virtue of an act of the Commonwealth of Massachusetts entitled “An Act Providing for the Elimination of the Crossing at Grade at Governor Square in the City of Boston by Street Railway Cars using the Boylston Street Subway, and Defining the Term ‘Transit Department of the City of Boston’ as Used in Certain Statutes”, being chapter three hundred and forty-one of the acts of the year one thousand nine hundred and twenty-five, as amended by an act of the Commonwealth of Massachusetts entitled “An Act Providing for the Elimination of the Crossing at Grade at Governor Square in the City of Boston by Street Railway Cars using the Boylston Street Subway”, being chapter three hundred and ninety-four of the acts of the year one thousand nine hundred and thirty, hereinafter called the act, and the Boston Elevated Railway Company, hereinafter called the company, witnesseth as follows:

II.— The city, pursuant to the act and in consideration of the covenants and agreements herein contained, grants to the company the sole and exclusive use of the alterations in and extensions to the Boylston street subway, hereinafter called the premises, as defined in the act and to be constructed under authority thereof and substantially in accordance with the plan prepared by the department numbered 17134 and entitled “City of Boston — Transit Department Plan Showing Alterations in and Extensions to the Boylston St. Subway Authorized by Chapter 394 of the Acts of 1930”, approved by the department of public utilities June 19, 1930 (D.P.U. 3935) and any alteration or alterations thereof agreed upon and approved as provided in the act, such grant being for the purposes provided in the act and such other uses as are hereinafter specified. No alteration of said plan shall be made without the consent of the company thereto in writing.

III.— The use shall begin when in the opinion of the department a reasonable time after completion has been allowed for equipment.

IV.— The term of years of the use shall extend from the beginning of the use to the expiration or termination of the contract now in existence between the city and the company for the use and operation of the Boylston street subway.

V.— The company at the dates hereinafter provided shall pay to the city for each full year ending with the last day of June and ratably for

any portion of a year an annual rental for the premises which shall be sufficient to provide an amount equal to one-half of one per cent. of the net cost of the premises in addition to the annual amount of interest on the Subway Bonds, as defined in the act, issued to pay for said net cost, but not less than four and one-half per cent. of said net cost in any event; provided, however, that said annual rental shall be payable by the company in any year only if and to the extent that the reserve fund provided for by section five of chapter one hundred and fifty-nine of the Special Acts of nineteen hundred and eighteen exceeds on the last day of June the amount originally established, such excess to be determined and obligation to pay such rental to accrue in priority to any reimbursement of the commonwealth under section eleven and thirteen of said chapter one hundred and fifty-nine.

The said net cost shall be deemed to include, except as is otherwise provided herein, all expenditures incurred in acquisition and construction including damages, expenses and salaries of the department and the interest on the debt incurred in construction prior to the beginning of the use of the premises for which Subway Bonds shall have been issued.

For the purpose of ascertaining the rental there shall be deducted from the cost the proceeds of sales and leases of lands, or rights or interests in lands or other property acquired by the department in connection with the construction of the premises, and the proceeds of sales or leases of buildings or other structures upon land so acquired, and the fair valuation of any such lands and other property no longer needed for the purposes of the act but not actually sold, as agreed upon by the department and the company, or in case of difference as determined by the department of public utilities. In ascertaining the net cost any interest received by the city upon the proceeds of Subway Bonds issued by it prior to the expenditure of such proceeds shall be credited against interest during construction.

For the purpose of ascertaining or determining the rental, however, the net cost shall not be deemed to exceed three million one hundred thousand dollars, increased by such sum or sums, if any, as may be agreed upon by the department and the company in the event that alterations in said plan numbered 17134 approved by the department of public utilities, June 19, 1930, are later agreed upon by the department and the company and approved as provided in the act.

The rental shall begin when the use begins.

The rental shall be paid to the city annually on the twenty-fifth day of July in each year and ratably for any portion of a year.

If at any time during the continuance of the term of this contract the company shall be deprived in whole or in part of the use of the premises or of the Boylston street subway so as to prevent the practicable use of the whole or a part of the premises in connection with said subway by any cause not due to any act of the company, its agents, servants or licensees, in the use of the premises, or not due to any negligence on its or their parts, or not due to any failure of the company to maintain the premises in good order and condition as herein provided, then the rental or a just and reasonable part thereof, as agreed upon by the mayor of the city and the company or in case of difference as determined by arbitration as hereinafter provided, shall be suspended or abated during such deprivation.

VI.—The company shall suitably lay and maintain in first class condition railway tracks in proper places in the premises, together with the appointments and apparatus necessary for the safe and convenient operation of the same and shall provide and maintain all wires, electrical or other apparatus or equipment necessary or convenient for the furnishing of power and light therein and shall further provide requisite pumps, fans and ventilating apparatus and in general shall completely equip and furnish the premises with all machinery, piping, apparatus and furniture proper and adapted thereto and necessary for the convenient maintenance and operation of a railway therein and for the safety and accommodation of the passengers upon such railway.

All tracks, wires, appliances, fixtures, machinery, equipment, furniture and apparatus provided by the company shall be and remain the property of the company so long as it continues to occupy and use the premises under the provisions of this contract, and upon the termination of such use the city hereby agrees to take and pay for all such property at its then fair value as agreed upon by the mayor of the city and the company or in case of difference as determined by arbitration as hereinafter provided, and the company agrees to deliver to the city all such property at such valuation.

VII.—The company shall maintain the premises, except as to repairs below excepted, in good order and condition as a structure complete so far as consistent with the provisions of the act, and adapted to the maintenance and use of lines of railway, and shall at all reasonable times be entitled to a permit to open the streets and other public grounds of the city for the purpose of making requisite repairs to the premises, and when the right of the company or its assigns to use the premises shall terminate shall restore them to the city in good condition except as to repairs not obligatory upon the company.

All repairs to the premises shall be at the sole cost and expense of the company except such repairs as are made necessary by any cause not due to any act of the company, its agents, servants or licensees in the use of the premises, or not due to any negligence on its or their parts, or not due to any failure of the company to maintain the premises in good order and condition as herein provided and except repairs growing out of the location, maintenance or use of the wires or other apparatus which the city is hereinafter authorized to maintain in the premises; and if any repairs shall become necessary other than those which are to be made at the sole cost and expense of the company as above provided, then such repairs shall be made by the city. In the event of disagreement as to the responsibility for repairs to the premises, the same shall be made by the city and the responsibility for ultimate payment of the cost and expense thereof shall be determined by arbitration as hereinafter provided.

VIII.—The city shall not be responsible to the company for damages of any description resulting from any defects in the premises, whether structural or arising out of want of repair or from any cause after the use of the same by the company has begun as hereinbefore provided, unless such damage result from the location, maintenance or use of the wires or other apparatus which the city is hereinafter authorized to maintain in the premises; nor shall it be responsible for any damages resulting to

persons or property in the operation and use of the premises, including all parts thereof, whether on property belonging to the city or upon property the fee of which belongs to other parties, and the company shall hold the city harmless and indemnified therefrom and shall at its own expense upon due notice from the city defend all suits and other proceedings of every description, whether at law or in equity which may be brought against the city, its officers, servants or agents by reason of any liability arising out of the operation and use of any portion of the premises or of the railways, machinery and apparatus therein and accruing after the right to use such portion has begun as herein provided, and shall satisfy all final judgments of legal tribunals rendered in such suits and proceedings.

The foregoing provisions shall not be construed to impose any liability or obligation upon the company for any cause not due to any act of the company, its agents, servants or licensees, in the use of the premises, or not due to any negligence on its or their parts, or not due to any failure of the company to maintain the premises in good order and condition as herein provided; or for any cause growing out of the location, maintenance or use of the wires or other apparatus which the city is hereinafter authorized to maintain in the premises.

IX.—The company shall keep the premises thoroughly clean and free from unnecessary dampness, and the approaches to stations clean and free from ice and snow. When the premises are in use it shall suitably light the same in all parts and by means of artificial ventilation shall keep the air adequately pure for health and comfort.

X.—The company within the limitations of the act may make such alterations in or additions to the premises as may be approved by the department.

XI.—To the extent of the power of the company so to do and the power of the department to contract therefor, the company may make such uses of the premises, not impairing the use for transportation of passengers, as it may from time to time determine; provided, however, that such use shall not diminish or impair the safety, accommodation, convenience of comfort of passengers using the premises; and the company agrees that upon receipt of notice in writing at any time or from time to time from the department of public utilities that in its opinion such use, whether in whole or in part, in any way diminishes or impairs such safety, accommodation, convenience or comfort or conflicts in any way with the best interests of the public, it will forthwith to the extent specified in the notice discontinue such use.

XII.—The company, upon such terms as it may deem expedient, may permit any person or corporation not authorized to carry on a railway business but authorized to use and maintain wires, conduits, tubes or similar structures along the route of the premises to place such wires, conduits, tubes or similar structures within a corresponding portion of the premises used by the company, but only to such extent, and for such time as may be practicable without interfering with the safe and convenient operation of the railway and other apparatus which the company is hereby authorized to put therein, but the privilege shall not extend to gas or water pipes.

XIII.— The city may place in the premises such wires and apparatus as may be necessary for its police, traffic and fire-alarm service, to be used, however, exclusively for such service, and to be so located as not to interfere with the use of the premises which the company is hereby authorized to make. The location, construction, maintenance and repair of such wires and apparatus shall be subject to such reasonable directions and regulations as the company may impose or in case of any disagreement as the department of public utilities may determine.

XIV.— In the event of the failure of the company or its assigns to maintain and operate a railway within the premises, and if such failure shall have continued for three months, then the city upon three months' notice, such default still continuing, shall have the right to terminate this contract and to re-enter upon and repossess itself of the premises, unless such failure to maintain and operate grows out of any cause not due to any act of the company, its agents, servants or licensees, in the use of the premises, or not due to any negligence on its or their parts, or not due to any failure of the company to maintain the premises in good order and condition as herein provided. In case the right of re-entry and repossession above given shall be exercised, all the tracks, wires, apparatus, equipment and other property in the nature of fixtures of the company or its assigns within the premises may be taken by the city and be paid for by it at a valuation to be determined as herein provided for the occasion when the same are to be surrendered by the company at the expiration of the term of this contract.

XV.— The company shall have no right at any time to remove from the premises any tracks, wires, apparatus, equipment or other property necessary to the use and maintenance of the premises and the operation of a railway therein, except for the purpose of repairs or renewal or for the substitution of equivalent structures, property, apparatus or equipment.

XVI.— The governor of the commonwealth, the mayor and commissioner of public works of the city, and the members of the department of public utilities and of the department, and their respective engineers shall at all times have free entry to the premises for the purpose of inspecting the same.

XVII.— In case of disagreement between the city acting by its mayor and the company as to the amount due for rental, or as to the suspension or abatement thereof as herein provided, or as to the valuation of the property upon the termination of the use herein contracted for, or on any matter as to which the method of arbitration is not hereinbefore provided for, the matter in dispute shall be left to the decision of three persons, one to be selected by the mayor of the city, one to be selected by the company, and the third by the two thus chosen. The report of the arbitrators, or the majority of them, shall be binding upon the parties hereto.

XVIII.— In respect of all matters arising under this contract where provision is made for action by the department or its approval of acts to be done by the company is required, it is provided and agreed that upon the termination of the existence of the department the authority to take such action shall vest in the city, which shall have all the rights, powers and

privileges and be subject to all the duties, restrictions and liabilities herein conferred or imposed upon the department in respect thereof; such powers to be exercised by the mayor, commissioner of public works and the city treasurer in place of the department or by such other officers as the city council may prescribe.

XIX.—With respect to the equipment, use and operation of the railway to be located in the premises and transportation thereon, the company is to have all the powers and privileges and be subject to all the duties, liabilities, restrictions and provisions set forth in general and special laws which now are or hereafter may be in force applicable to it.

XX.—This contract shall not in any respect impair any right which the commonwealth or the city, or any other licensee of the commonwealth may at any time have to take the railway properties of the company. In the event of such taking the compensation to be paid to the company shall not be enhanced by reason of this contract nor shall it be diminished because of the fact that without this contract the connection between different parts of said properties might be cut off.

XXI.—In so far as this contract is not in the same general form as those authorized by chapter seven hundred and forty-one of the acts of nineteen hundred and eleven, the provisions differing therefrom are agreed upon by the department and the company as specially applicable to the demised premises to the full extent of their authority so to do, but all provisions of law or existing contracts which are required by the act to be made a part of this contract are hereby incorporated by reference and made a part hereof, and it is understood and agreed that anything herein contained which is contrary to or inconsistent with the provisions of the act is and shall be void and of no effect.

IN WITNESS WHEREOF the parties hereto set their hands and seals the day and year first above written, the city of Boston acting by the department, pursuant to a vote of the department, its members not being bound in their personal capacity, and the Boston Elevated Railway Company, pursuant to a vote of its board of trustees, causing its name and corporate seal to be affixed to these presents by its treasurer thereto duly authorized.

| | | | |
|------------|---------------------------------|-------|--------------------|
| | | (Sgd) | |
| | THE CITY OF BOSTON | } | THOMAS F. SULLIVAN |
| (SEAL OF | by the | | |
| THE CITY | TRANSIT DEPARTMENT | | NATHAN A. HELLER |
| OF BOSTON) | of the | | ARTHUR B. CORBETT |
| | CITY OF BOSTON | | |
| | BOSTON ELEVATED RAILWAY COMPANY | | |
| | (Sgd) HENRY L. WILSON, | | SEAL OF BOSTON |
| | | | ELEVATED RAIL- |
| | | | WAY COMPANY. |
| | | | <i>Treasurer.</i> |

APPROVED AS TO FORM

(Sgd) SAMUEL SILVERMAN,
Corporation Counsel, City of Boston.

APPROVED

(Sgd) JAMES M. CURLEY,
Mayor of Boston.

At a regular meeting of the Transit Department held on June 30, 1930, the foregoing contract or lease being under consideration it was

"VOTED, that the contract for sole and exclusive use or lease of the alterations in and extensions to the Boylston street subway in the form now under consideration be executed by the department in the name and behalf and under the seal of the City of Boston and that as evidence thereof the same be signed by members constituting a majority of the department."

Attest:

(Sgd) EDWARD F. CONDON,
Secretary.

At a meeting of the Board of Directors of the Boston Elevated Railway Company duly called and held June 26, 1930, a quorum being present and voting, the following vote was adopted:

WHEREAS, the Board of Trustees of the Boston Elevated Railway Company on June 18, 1930 voted "That the Board of Directors of the Boston Elevated Railway Company be requested to consent to the making by the Board of Trustees of the Boston Elevated Railway Company in the name and on behalf of the Company of a contract for the sole and exclusive use by the Company of the alterations in and extensions to the Boylston Street Subway as authorized and defined in Chapter three hundred and forty-one of the Acts of nineteen hundred and twenty-five as amended by chapter three hundred and ninety-four of the Acts of the year nineteen hundred and thirty, upon the terms and conditions provided in said Act as so amended;" and

WHEREAS, a form of contract with the City of Boston for the exclusive use of alterations in and extensions to the Boylston Street Subway, in accordance with the plan prepared by the Transit Department of the City of Boston, No. 17134, entitled "City of Boston — Transit Department Plan Showing Alterations in and Extensions to the Boylston St. Subway Authorized by Chapter 394 of the Acts of 1930", approved by the Department of Public Utilities, June 19, 1930 (D.P.U. 3935) to be constructed under and in accordance with Chapter 341 of the Acts of 1925, as amended by Chapter 394 of the Acts of 1930, has been presented to the meeting; and

WHEREAS, Mr. Frederic E. Snow, General Solicitor for this Board, advises that said contract is in due and proper form —

On motion duly made and seconded, it was

VOTED. That the consent is hereby given to the making of said contract for use by the Board of Trustees of the Boston Elevated Railway Company in the name and on behalf of the Company.

I hereby certify that the foregoing is a true copy of a vote adopted by the Board of Directors of the Boston Elevated Railway Company at a meeting duly held on the Twenty-sixth day of June, 1930.

Attest:

(Sgd) WILLIAM L. BARNARD
Secretary, Board of Directors,
Boston Elevated Railway Company.

(Sgd) CHARLES B. GLEASON
Clerk, Boston Elevated Railway
Company.

A form of contract with the City of Boston for the exclusive use of alterations in and extensions to the Boylston Street Subway, in accordance with the plan prepared by the Transit Department of the City of Boston, No. 17134, entitled "City of Boston — Transit Department Plan Showing Alterations in and Extensions to the Boylston St. Subway Authorized by Chapter 394 of the Acts of 1930", approved by the department of public utilities, June 19, 1930 (D. P. U. 3935) to be constructed under and in accordance with Chapter 341 of the Acts of 1925, as amended by Chapter 394 of the Acts of 1930, having been presented to the meeting, it was

VOTED: That Henry L. Wilson, Treasurer, be authorized in the name and on behalf of the Boston Elevated Railway Company to sign, seal, acknowledge and deliver said contract for use provided the Board of Directors of the Boston Elevated Railway Company consent to the making of said contract by this Board.

I hereby certify that the foregoing is a true copy of vote adopted by the Board of Trustees of the Boston Elevated Railway Company at a meeting duly held on the Twenty-fifth day of June, 1930.

Attest:

(Sgd) EMMA E. MULLEN
*Recording Secretary of Board of
Trustees of the Boston Elevated
Railway Company.*

(Sgd) CHARLES B. GLEASON
*Clerk, Boston Elevated Railway
Company.*

At a regular meeting of the Transit Department held on June 30, 1930 it was

"VOTED, that the Chairman be authorized to acknowledge the foregoing instrument in the name and behalf of the department to be the free act and deed of the City of Boston."

Attest:

(Sgd) EDWARD F. CONDON
Secretary.

COMMONWEALTH OF MASSACHUSETTS.

SUFFOLK ss

BOSTON, June 30, 1930.

Then personally appeared Thomas F. Sullivan, Chairman of the Transit Department of the City of Boston, and acknowledged the foregoing instrument in the name and behalf of said department to be the free act and deed of the City of Boston.

Before me,

(Sgd) EDWARD F. CONDON
Notary Public.

APPENDIX C.

December 31, 1930.

The names of those who have been employed in the Engineering Division for more than one month during the period covered by this report are given below, together with an indication of the principal work upon which they have been engaged.

WILBUR W. DAVIS, *Assistant Chief Engineer*. In general charge of construction

LEONARD B. HOWE, *Designing Engineer*. In general charge of designing.

Assistant Engineers.

THOMAS N. ASHTON. Designs and details, Traffic Tunnel and Boylston Street Subway Extension.

JOHN A. BERRIGAN. Alignment calculations, plans and designs, Traffic Tunnel and Boylston Street Subway Extension.

THOMAS A. BERRIGAN. Plans and designs for reinforced concrete and steel work, Traffic Tunnel and Boylston Street Subway Extension.

RALPH F. BOUDREAU. Surveys, Traffic Tunnel.

JAMES D. BURNS. Plans and designs for steel work, Traffic Tunnel and Boylston Street Subway Extension.

HARRY T. CARROLL. Supervision of construction, Boylston Street Subway Extension. Surveys, Traffic Tunnel.

STANLEY J. CLIFFORD. Plans, Traffic Tunnel and Boylston Street Subway Extension. Surveys, Traffic Tunnel.

JOHN J. CUMMINGS. Plans and details, Traffic Tunnel and Boylston Street Subway Extension.

LESTER S. DANIELS. Record plans, Dorchester Rapid Transit. Damage claims, Section K, Dorchester Tunnel. Supervision of lines and grades, Boylston Street Subway Extension.

JOSEPH P. DEVER. Studies, specifications and estimates for Traffic Tunnel and Boylston Street Subway Extension. Supervision, Adams Street Bridge Alterations.

ROBERT B. FARWELL. Supervision of surveys, Traffic Tunnel.

RALPH A. FISHER. Designs and details of structural steel and reinforced concrete structures, Traffic Tunnel and Boylston Street Subway Extension.

LAURENCE R. FLYNN. Accounts and Calculations, Traffic Tunnel and Boylston Street Subway Extension.

LOUIS J. HARRIGAN. Designs and detail plans for sewers, etc., Traffic Tunnel and Boylston Street Subway Extension.

HERBERT D. HURLEY. Research work and studies for ventilation, Traffic Tunnel. Designs and details for ventilation buildings, Traffic Tunnel.

GEORGE G. HYLAND. Lines and Grades, Boylston Street Subway Extension.

- JOHN M. KENNEY. Plans and details for Traffic Tunnel and Boylston Street Subway Extension.
- WILLIAM W. LEWIS. Supervision of construction, Boylston Street Subway Extension and Newbury Substation.
- BENJAMIN A. LOVELAND. Designs and details for structural steel and reinforced concrete structures, Traffic Tunnel and Boylston Street Subway Extension.
- SAMUEL C. LYMAN. In charge of stockyard and steel shop at Cypher Street.
- ARTHUR V. LYNCH. Supervision of calculations, taking plans, designs and details plans for Traffic Tunnel and Boylston Street Subway Extension.
- HARRY H. LYNN. Plans and details, Traffic Tunnel and Boylston Street Subway Extension.
- HARRY F. SAWTELLE. Supervision of designs and details for structural steel and reinforced concrete structures, Traffic Tunnel, Boylston Street Subway Extension.
- HERBERT R. STEARNS. Supervision of track alignment calculations, taking plans, designs and detail plans for Traffic Tunnel and Boylston Street Subway Extension.
- LEO S. STONE. Estimates and specifications, Traffic Tunnel and Boylston Street Subway Extension.
- EDWARD SULESKY. Designs and details for structural steel and reinforced concrete structures for Traffic Tunnel and Boylston Street Subway Extension.
- ARTHUR W. VOSE. Supervision of detail plans, etc., Traffic Tunnel and Boylston Street Subway Extension.
- DAVID B. WEDEN. Designs and details for structural steel and reinforced concrete structures for Traffic Tunnel and Boylston Street Subway Extension.

Draftsmen.

- JAMES BALLANCE. Plans, Traffic Tunnel.
- HENRY W. BENSON. Electrical design, Traffic Tunnel.
- WILLIAM A. BENTON. Plans, Boylston Street Subway Extension.
- BORIS BERESTNEFF. Designs and plans for Traffic Tunnel and Boylston Street Subway Extension.
- * ROBERT R. BROWN. Plans, Boylston Street Subway Extension.
- VINCENT CAVANAUGH. Plans, Boylston Street Subway Extension.
- ALEXANDER B. DAYTZ. Designs, Boylston Street Subway Extension.
- WALTER A. FORD. Plans, Boylston Street Subway Extension.
- ROBERT D. GARDNER. Plans, Traffic Tunnel and Boylston Street Subway Extension.
- * HOWARD G. GILBERT. Plans, Boylston Street Subway Extension.
- GEORGE W. GILE. Plans, Boylston Street Subway Extension.
- JOHN C. GROGAN. Cost Accounting, Boylston Street Subway Extension.
- IRWIN J. HENNESSY. Plans, Boylston Street Subway Extension and Traffic Tunnel.
- JOHN F. HOWARD. Plans, Traffic Tunnel and Boylston Street Subway Extension.

* Left the employ of the Transit Department.

- J. E. HUARD, JR. Plans, Boylston Street Subway Extension.
 EVERETT K. ISAACS. Electrical design, Traffic Tunnel.
 FRANCIS MAHONEY. Plans, Traffic Tunnel and Boylston Street Subway Extension.
 SIDNEY H. C. PERROW. Ventilation building plans, Traffic Tunnel.
 RALPH A. PLUNKETT. Plans and details, Traffic Tunnel and Boylston Street Subway Extension.
 HARRY W. POULAS. Plans, Traffic Tunnel and Boylston Street Subway Extension.
 KENNETH W. ROBIE. Plans, Traffic Tunnel and Boylston Street Subway Extension.
 KARL R. SAUNDERS. Plans and details for Traffic Tunnel and Boylston Street Subway Extension.
 FRANCIS W. VOGEL. Plans and deeds, Traffic Tunnel. Plans, Boylston Street Subway Extension.

Transitmen.

- ROBERT S. BOWES. Lines and grades, Massachusetts Substation, Boylston Street Subway Extension and Traffic Tunnel. Record plans for Section 5B, D. R. T. Surveys for Traffic Tunnel and Boylston Street Subway Extension.
 PATRICK H. BOYLE. Surveys and Inspection, Traffic Tunnel.
 THOMAS E. CARNEY. Surveys, Traffic Tunnel and Boylston Street Subway Extension.
 STEPHEN D. DESROCHE. Reinforcing rod schedules, Boylston Street Subway Extension.
 MICHAEL J. DRISCOLL. Surveys, Traffic Tunnel and Boylston Street Subway Extension. Lines and grades, Boylston Street Subway Extension.
 JOHN C. DRUMMOND. Lines and grades, Boylston Street Subway Extension.
 MICHAEL S. FOGARTY. Record plans, Section 5A, Dorchester Rapid Transit. Surveys, Traffic Tunnel. Lines and grades, Newbury Substation. Cost accounting and Timekeeping, Boylston Street Subway Extension.
 ENOCH F. GREENE, JR. Surveys, lines and grades, Boylston Street Subway Extension.
 * JOSEPH A. KOMICH. Surveys, Traffic Tunnel.
 ALBERT I. McDERMOTT. Plans and deeds, Traffic Tunnel.
 DONALD J. McDONALD. Lines and grades, Boylston Street Subway Extension.
 FRANK A. RULL. Photography and blueprinting.
 FREDERIC W. STILES. Care of plans, survey records, etc., general office work.

Rodmen.

- WILLIAM J. AHEARN. Timekeeping, Boylston Street Subway Extension.
 * PICKARD ARNOLD. Surveys, Traffic Tunnel and Boylston Street Subway Extension.
 JOHN A. BEGG. Lines and grades, Boylston Street Subway Extension.

* Left the employ of the Transit Department.

* BENJAMIN M. BOHRER. Surveys for Traffic Tunnel.

EVERETT J. CAHILL. Lines and grades, Boylston Street Subway Extension.

*JOHN CONNELL. Surveys, Traffic Tunnel, Timekeeping, Boylston Street Subway Extension.

WILLIAM M. DALY. Office work.

CHARLES T. DINNEEN. Surveys, Traffic Tunnel and Boylston Street Subway Extension.

*LAWRENCE P. DONNELLY. Surveys, Traffic Tunnel.

JOSEPH F. DONOVAN. Office work, Boylston Street Subway Extension.

CHARLES W. FAGAN. Surveys, Traffic Tunnel.

*JOHN T. FEENEY. Surveys, Boylston Street Subway Extension.

WILLIAM F. FLYNN. Lines and grades, Boylston Street Subway Extension.

PAUL F. FORD. Surveys, Traffic Tunnel and Boylston Street Subway Extension. Lines and grades, Boylston Street Subway Extension.

*ERNEST J. GRIMM. Surveys, Traffic Tunnel.

HERBERT C. HAWKINS. Plans, Traffic Tunnel and Boylston Street Subway Extension.

Clerical Force.

JOHN J. BRADLEY. Clerk. Daily Reports for Rapid Transit Lines, Traffic Tunnel and Boylston Street Subway Extension.

KATHERINE I. DRISCOLL. Clerk and Stenographer.

JOHN J. FARREN. Construction Cost Accountant.

HENRY F. HORADAN. Blueprinting.

MARY E. McKERNAN. Clerk.

MABEL A. MURPHY. Stenographer.

THOMAS J. MULDOON. Clerk and Stenographer at Cypher Street Stockyard.

WILLIAM J. SKIFFINGTON. Blueprinting, photography, etc.

*THOMAS E. SULLIVAN. Clerk.

*RICHARD F. TOBIN. Field work, Section 1 and 5C, Dorchester Rapid Transit, East Boston Traffic Tunnel.

*Left the employ of the Transit Department.

APPENDIX D.

BIDS FOR BUILDING SUB-POWER STATION, NEAR MASSACHUSETTS STATION,
BOYLSTON STREET SUBWAY. MARCH 31, 1930.

| BIDDER. | Estimated Price. |
|---|------------------|
| A. G. Tomasello & Son, Inc..... | \$29,975 00 |
| Leo J. Nawn, Inc..... | 22,900 00 |
| Banspar Construction Company..... | 22,882 00 |
| Hub Construction Company..... | 19,249 00 |
| M. S. Kelliher Company..... | 16,790 00 |
| Guiney & Hanson Construction Company..... | 16,700 00 |
| M. Solimando..... | 15,490 00 |
| J. A. Singarella * | 15,270 00 |

* Awarded. Contract 951.

APPENDIX E.

BIDS FOR BORINGS FOR TRAFFIC TUNNEL. MAY 26, 1930.

| BIDDER. | Estimated Price. |
|--|------------------|
| Pennsylvania Drilling Company..... | \$7,300 00 |
| The Gow Company, Inc..... | 4,650 00 |
| Philip J. Healey, Inc..... | 4,193 75 |
| The Pierce Company, Inc..... | 4,025 00 |
| Sprague & Henwood, Inc..... | 3,660 00 |
| Kennedy-Riegger Drilling Company, Inc..... | 2,653 75 |
| B. F. Smith & Co., Inc.*..... | 2,545 00 |

* Awarded. Contract V-1.

APPENDIX F.

BIDS FOR FURNISHING AND DELIVERING 1,300,000 POUNDS, MORE OR LESS,
OF DEFORMED STEEL REINFORCING RODS. BOYLSTON STREET SUB-
WAY — 1930. JULY 28, 1930.

| BIDDER. | Estimated Price. |
|-----------------------------------|------------------|
| Stahleker Steel Corporation..... | \$27,650 00 |
| Joseph T. Ryerson & Son, Inc..... | 27,000 00 |
| Truscon Steel Company..... | 27,000 00 |
| McClintic Marshall Company..... | 27,000 00 |
| Concrete Steel Company..... | 27,000 00 |
| Kalman Steel Company, Inc.*..... | 26,220 00 |

* Awarded. Contract 956.

APPENDIX G.

BIDS FOR FURNISHING AND DELIVERING 250 TONS, MORE OR LESS, OF
ASPHALT. BOYLSTON STREET SUBWAY—1930. JULY 28, 1930.

| BIDDER. | Price per ton. |
|---------------------------------------|----------------|
| Travers-Sandell, Inc..... | \$34 50 |
| Trimount Oil Company..... | 32 90 |
| The Texas Company..... | 24 74 |
| Johns-Manville Sales Corp..... | 22 80 |
| Standard Oil Company of New York..... | 22 63 |
| The Lehon Company..... | 22 60 |
| Minwax Company, Inc.*..... | 22 00 |

* Awarded. Contract 954.

APPENDIX H.

BIDS FOR FURNISHING AND DELIVERING 100,000 SQUARE YARDS, MORE OR
LESS, OF ASPHALT SATURATED FABRIC. BOYLSTON STREET SUBWAY
—1930. JULY 28, 1930.

| BIDDER. | Price Per Square Yard. |
|--------------------------------|---------------------------|
| Travers-Sandell, Inc..... | 17 cents |
| The Philip Carey Company..... | 16 " |
| Johns-Manville Sales Corp..... | 16 " |
| The Lehon Company..... | 14 $\frac{1}{2}$ " |
| Minwax Company, Inc.*..... | 13 $\frac{3}{4}$ " |

* Awarded. Contract 955.

APPENDIX I.

BIDS FOR FURNISHING AUTOMOBILE TRUCKS FOR BOYLSTON STREET SUBWAY — 1930, AT AND NEAR GOVERNOR SQUARE. JULY 28, 1930.

| BIDDERS. | Price Per 8-Hour Day. |
|---|-----------------------|
| Edward J. Byrne..... | \$24 00 |
| J. C. Coleman & Sons Co., Inc..... | 24 00 |
| Francis L. Trainor..... | 24 00 |
| A. J. Brown & Co..... | 22 00 |
| Coleman Brothers, Inc..... | 22 00 |
| H. P. Welch Company..... | 22 00 |
| H. B. Church Truck Service..... | 21 84 |
| W. J. C. Company, Inc..... | 20 00 |
| Consolidated Trucking Company..... | 19 72 |
| C. E. Hall & Sons, Inc..... | 19 60 |
| A. DeStefano & Co..... | 19 50 |
| James A. Stretch Company, Inc..... | 18 90 |
| Dooley Brothers, Inc..... | 18 80 |
| Thomas Joseph McCue..... | 17 75 |
| M. Doyle & Co., Inc..... | 17 49 |
| Joseph P. McCabe, Inc..... | 17 00 |
| M. McGinnis Company *..... | 16 95 |
| Massachusetts Contracting Company, Inc..... | 15 90 |

* Awarded. Contract 958.

APPENDIX J.

BIDS FOR FURNISHING DOUGLAS FIR AND LONG LEAF YELLOW PINE, BOYLSTON STREET SUBWAY — 1930. AUGUST 4, 1930.

| BIDDER. | Estimated Price. | Notes. |
|--|------------------|----------------------------|
| Downes Lumber Company..... | \$30,700 00 | } Bidding on all 13 items. |
| Howell Lumber Company..... | 23,906 10 | |
| Leatherbee Company..... | 23,160 00 | |
| Curtis & Pope Lumber Company..... | 22,781 00 | |
| George McQuesten Company..... | 22,675 00 | |
| Massachusetts Lime and Cement Company *..... | 22,535 00 | } Bidding on 10 items. |
| Downer Lumber Company..... | 20,180 00 | |
| Cronin Lumber Company..... | 3,900 00 | Bidding on 3 items. |

* Awarded. Contract 959.

APPENDIX K.

BIDS FOR CONSTRUCTION OF FOUR STATION CANOPIES, DORCHESTER
DORCHESTER RAPID TRANSIT. SEPTEMBER 22, 1930.

| BIDDER. | Estimated Price. |
|-----------------------------------|------------------|
| Banspar Construction Company..... | \$6,666 00 |
| Hill & Delaney..... | 6,250 00 |
| J. A. Singarella..... | 5,800 00 |
| John Bowen Company *..... | 5,249 00 |

* Awarded. Contract 960.

APPENDIX L.

BIDS FOR FURNISHING AND DELIVERING LONG LEAF YELLOW PINE.
BOYLSTON STREET SUBWAY — 1930. SEPTEMBER 22, 1930.

| BIDDER. | Estimated Price. |
|-----------------------------------|------------------|
| Place Lumber Company..... | \$17,560 00 |
| Downes Lumber Company..... | 17,107 50 |
| C. E. McManus Lumber Company..... | 16,875 00 |
| Downer Lumber Company..... | 15,900 00 |
| Curtis & Pope Lumber Company..... | 15,526 25 |
| Howell Lumber Company..... | 15,500 00 |
| George McQuesten Company *..... | 14,490 00 |

* Awarded. Contract 961.

APPENDIX M.

BIDS FOR FURNISHING AND DELIVERING DOUGLAS FIR AND SPRUCE LUM-
BER, BOYLSTON STREET SUBWAY — 1930. SEPTEMBER 22, 1930.

| BIDDER. | Estimated Price. |
|-----------------------------------|------------------|
| Howell Lumber Company..... | \$9,237 59 |
| C. E. McManus Lumber Company..... | 9,295 00 |
| Curtis & Pope Lumber Company..... | 9,110 40 |
| Barney & Carey Company..... | 8,504 60 |
| Downes Lumber Company..... | 8,470 00 |
| George McQuesten Company *..... | 8,085 00 |

* Awarded. Contract 962.

APPENDIX N.

BIDS FOR FURNISHING AND DELIVERING WIRE NAILS, BOYLSTON STREET
SUBWAY — 1930. SEPTEMBER 22, 1930.

| BIDDER. | Estimated Price. |
|---------------------------------|------------------|
| Haymarket Hardware Company..... | \$2,845 00 |
| Northern Steel Company..... | 2,709 25 |
| Chase, Parker & Co., Inc.*..... | 2,578 91 |

* Awarded. Contract 963.

APPENDIX O.

BIDS FOR FURNISHING 48-INCH STEEL WATER PIPE, BOYLSTON STREET
SUBWAY — 1930. NOVEMBER 20, 1930.

| BIDDER. | Estimated Price. |
|--|------------------|
| Crane Company †..... | \$57,614 00 |
| Walsh Holyoke Steam Boiler Works, Inc.*..... | 49,798 00 |

* Awarded. Contract 972.

† Bid irregular.

APPENDIX P.

BIDS FOR REMOVING BUILDINGS 49-63 PORTER STREET AND 164 AND 166
HAVRE STREET, EAST BOSTON, ON THE LINE OF THE TRAFFIC TUNNEL.
NOVEMBER 24, 1930.

| BIDDER. | City to Pay to Contractor. |
|--|-------------------------------|
| City Building Wrecking Company..... | \$967 50 |
| East Boston Building Wrecking Company..... | 950 00 |
| Central Building Wrecking Company..... | 525 00 |
| American Building Wrecking Company..... | 525 00 |
| BIDDER. | Contractor to Pay to City. |
| New England Building Wrecking Company..... | \$92 50 |
| Chelsea Building Wrecking Company..... | 95 00 |
| John M. McDonald..... | 100 00 |
| New York Building Wrecking Company*..... | 310 00 |

* Awarded. Contract V-3.

APPENDIX Q.

BIDS FOR REMOVING CERTAIN BUILDINGS IN BOSTON PROPER AND EAST BOSTON FROM THE LINE OF THE TRAFFIC TUNNEL. DECEMBER 22, 1930.

| BIDDER. | City to Pay to Contractor. |
|--|-------------------------------|
| Atlantic Building Wrecking Company..... | \$5,000 00 |
| New York Building Wrecking Company..... | 4,985 00 |
| John J. Duane..... | 4,325 00 |
| New England Building Wrecking Company..... | 3,326 00 |
| Mystic Building Wrecking Company..... | 2,534 00 |
| Chelsea Building Wrecking Company..... | 1,955 00 |
| City Building Wrecking Company..... | 1,622 00 |
| American Building Wrecking Company..... | 1,465 00 |
| Central Building Wrecking Company*..... | 1,275 00 |

* Awarded. Contract V-4.

APPENDIX R.

BIDS FOR FURNISHING SPRUCE OR DOUGLAS FIR AND LONG LEAF YELLOW PINE LUMBER. BOYLSTON STREET SUBWAY—1930. DECEMBER 29, 1930.

| BIDDER. | ESTIMATED PRICE. | | |
|-----------------------------|------------------|-----------------------------|---------------------------|
| | Spruce. | Alternative Douglas Fir. | Long Leaf Yellow Pine. |
| Hutchinson Lumber Company, | \$8,750 00 | \$8,750 00 | \$1,325 00 |
| Barney & Carey Company†.... | 10,437 50 | 8,437 00 | |
| Downes Lumber Company.... | 8,000 00 | 7,000 00 | 1,625 00 |
| Howell Lumber Company.... | 8,125 00 | 6,875 00 | 1,062 50 |
| George McQuesten Company.. | 7,225 00 | *6,725 00 | *997 00 |

* Awarded. Contract 974.

† No bid.



